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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 627.] SATURDAY, JULY 1, 1882. [PRICE FOURPENCE.

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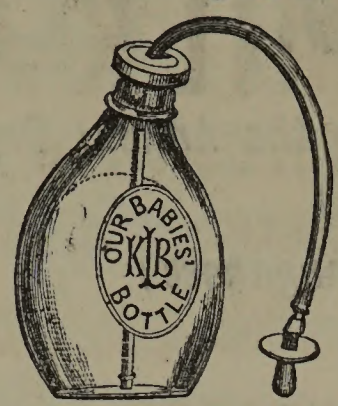

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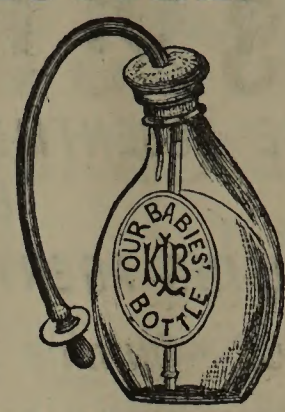

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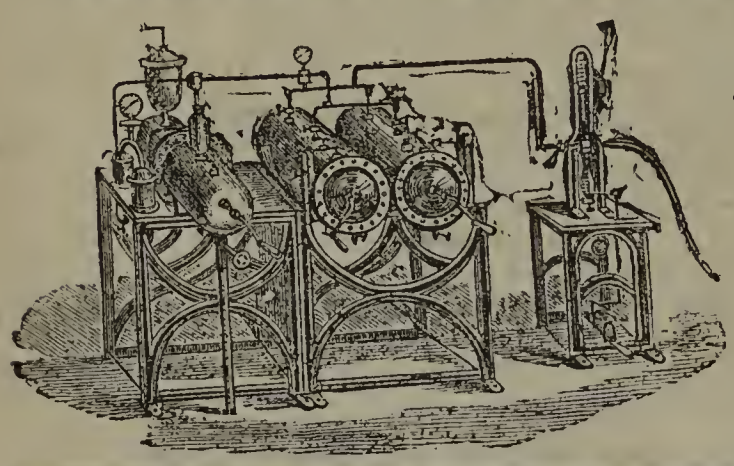

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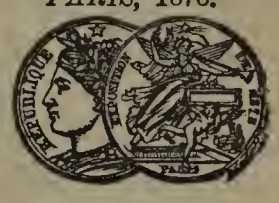

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BURK'S CINCHONIC WINE. FERRUGINOUS.

BURK'S FERRUGINOUS CINCHONIC WINE. Of an agreeable flavour and easily digestible, [containing Iron in a dissolved state.

All these Wines will keep good for any length of time in any Climate, so are specially suited for Export. Sold by all Chemists and Druggists, in bottles of three sizes, at 2s., 4s. 6d. and 9s.

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There is perfect equality among these wines as regards their essential constituents. They all contain 1·5 per cent. of cinchonic extractives and 0·2 per cent. of alkaloid salts of cinchona. The ferruginous cinchonic wine contains, moreover, 1 per cent. of ammonia-citrate of iron, equal to 2·0 per cent. of oxyd of iron, or 0·14 per cent. of metallic iron.

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MACKEYS' QUINQUININE (Registered),

Which contains the pure Alkaloids of the officinal Cinchona Barks, and has been largely used in hospital and private practice with great success. *Takes the place of Quinine at less than half the price. Every genuine bottle has the name Mackey, Mackey & Co.*

TESTIMONIALS.—"Therapeutically *Mackeys' Quinquinine equals Sulphate of Quinine.* It is a certain tonic, and a sheet-anchor in cases where fever remits or intermits. THOS. HORNE, L.R.C.P., Sandwich."—From N. N. de Froloff, Pskow. "Pskow, le 17 Août, 1880. Messrs. Mackey, Mackey & Co. Messieurs,—Je puis témoigner devant tout le monde que *votre Quinquinine est plus actif que même Sulfate de Quinine.* Des grandes doses et pendant plus ou moins longtemps ne font pas des hallucinations comme Sulfate de Quinine. Les fièvres intermittentes se guérissent avec QUINQUININE pendant une semaine tout à fait. Professeur de Chimie et Pharmacie, pp. N. N. DE FROLOFF & Co. Assistant, V. Taun."

"The value of *Mackeys' Quinquinine as an anti-periodic is certainly equal to that of Quinine,* and as a tonic it possesses the advantage of being easily assimilated in cases where Quinine or even Bark would not be tonic."—CHEMISTS' JOURNAL, September 3rd.

Mr. F. OLDFIELD writes from Bloemfontein, S. Africa:—"Please send Mackeys' Quinquinine; it suits here better than quinine."

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"OF GREAT USE IN HABITUAL CONSTIPATION."
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"Has invariably good and prompt success; a most valuable item in the balneological treasury." Professor Virchow, *Berlin.*

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"New York Medical Journal," *August* 1880, Dr. F. Weir, *in Lecture delivered to the College of Physicians and Surgeons, New York.*

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Of all Chemists, 1s. 6d. and 2s. per bottle. Ordinary Dose, a Wineglassful.
It is most efficacious when taken in the morning fasting, warmed to a temperature not below 60°, or when an equal quantity of hot water is added to it.

The
Pharmaceutical Journal
AND
Transactions.

VOL. XIII.—JULY 1, 1882.

THERMO-MICROSCOPY IN PHARMACY.

BY W. H. SYMONS, F.R.M.S., F.C.S.

The effects of heat upon a body are often some of the most important data in the examination of that body; this is especially so in the case of organic compounds. To propose a method of studying a few of these effects is the object of the present paper.

Some months ago, I exhibited at the Royal Microscopical Society "a hot or cold stage for the microscope," and was subsequently asked to bring it further under the notice of the Fellows of that Society at one of their evening meetings.

This was done on December 14, of last year; the paper, with an illustration, was given in the Journal published in February of this year. The apparatus has since received the approval of eminent scientific men, and possibly some of its applications in pharmacy may not be uninteresting to the readers of this Journal.

The stage first described was intended for comparatively low temperatures, being furnished with a special form of thermometer graduated to 150° C.; it was, moreover, somewhat expensive and liable to get out of order. The form here figured can be obtained for a nominal sum, is capable of being used with an ordinary thermometer, and is available for all temperatures within the range of that instrument.

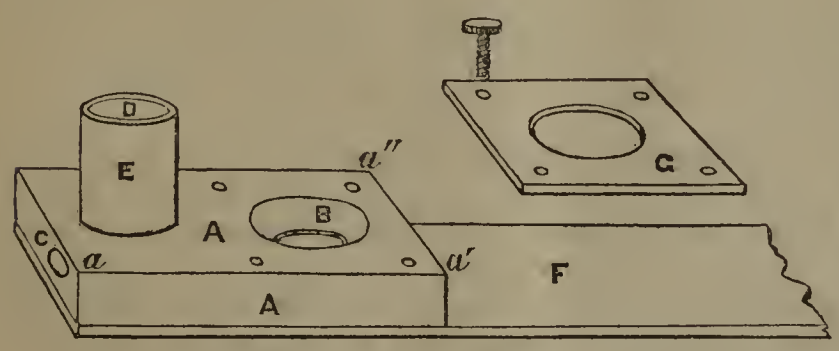

Fig. 1.

It is made principally of one piece of copper, A, and measures from *a* to *a'* 6 cm., from *a'* to *a''* 4 cm., and is 2 cm. thick. A hole, B, 2·5 cm. in diameter, passes right through it, but is closed on both sides by thin glass or mica held between thin rings of cork by means of plates, as G, which are screwed down sufficiently tight to prevent leakage. A slightly tapering hole, C, is drilled lengthways, on one side, through the copper; it meets and extends a little beyond the hole, B, and is sufficiently large to take a cork carrying a thermometer. The tube, E, is in one piece with the rest, and its bore, D, meets the canal, C. A piece of copper, F, some 3 mm. thick, extends about 15 cm. beyond one end, and should be brazed on to the body before the hole, B, is drilled. The whole arrangement may advantageously be plated with platinum, silver, or nickel, care being taken to insure the complete coating of the inner surfaces. The part placed on the stage of the microscope is mounted on some non-conducting body, such as a piece of well-seasoned mahogany. An aperture corresponding with B is of course left.

The thin glasses or mica having been firmly packed in their places, and the thermometer put in position, taking care that it does not come into contact with any portion of the metal, perfumed oil is carefully poured into the open aperture, D, until, when in a horizontal position, it completely fills the space B; the whole arrangement is then placed on the stage of a microscope, so that B shall correspond with its optic axis. The object to be examined is placed on the upper thin glass.

Melting Points.—For example, suppose we wish to take the melting point of wax. A small piece of that substance, about the size of a pin's head, is so placed, covered with a piece of thin glass and surrounded by a cardboard shade (a bottomless pill box answers well) to protect from currents of cold air; heat is now applied to the projecting copper plate until the wax melts; the temperature being observed, the source of heat is removed, and, when the wax has congealed, the crystals in it are focussed. Heat is again cautiously applied so that when the temperature approaches that at which the wax was observed to melt it shall rise very slowly, the crystals at the same time are carefully watched; the moment they disappear the temperature is noted and is considered "the melting point." The heat being removed, the field is watched for the reappearance of the crystals; as a rule this occurs very near the same temperature as their disappearance, cacao butter being a notable exception to this.

The following are some results by this method:—

Beeswax	61° C.
White wax, genuine	61° C.
White wax, commercial	51° to 55° C.
Paraffin wax, of low melting point	50° C.
Spermaceti	43° C.

Attention is particularly directed to the samples of white wax. Several lots were examined with fairly constant results, and, therefore, the above are not to be considered exceptional; they undoubtedly contain paraffin or spermaceti. The almost constant presence of an adulterant, of low melting point, in commercial white wax, may, to some extent, account

for the difficulty experienced in obtaining spermaceti ointment of suitable consistence if made according to the official formula. The adulterators might at all events use a paraffin wax of suitable melting point, if indeed they cannot supply a pure article.

This mode of taking the melting point possesses in the case of fats no advantage over that usually followed; it is merely noticed in passing. In the case of resins and alkaloids, to be spoken of hereafter, it is, however, exceedingly useful.

Starches.—The tumefaction of granules of starch may be observed in much the same way. The starch is rubbed down with water, and a drop of the mixture placed on the stage and covered with a thin glass and shade as in the case of wax; the bursting of individual granules can then be observed, taking care that the temperature rises very slowly.

The following are some results by this process :—

Starch.	A few swollen.	Majority swollen.	All swollen.
Tous-les-mois	65° C.	68° C.	74° C.
Potato	55° C.	60° C.	65° C.
Sago	64° C.	68° C.	74° C.
Maranta, var. Bermuda .	62° C.	69° C.	73° C.
Maranta, var. Natal . .	58° C.	65° C.	70° C.
Maranta, var. St. Vincent	66° C.	73° C.	77° C.
Wheat	60° C.	65° C.	70° C.
Maize	65° C.	70° C.	77° C.
Cassava	58° C.	63° C.	68° C.
Oat	65° C.	70° C.	77° C.
Rice	70° C.	75° C.	80° C.

As a control to the above method the respective starches were mixed with ten times their weight of water and the mixtures placed in thin test tubes, of equal size, in a double water-bath, and gradually heated; the water in the inner bath was at no time allowed to exceed the temperature of the mixtures by more than 2° C., and the water in the outer bath not more than 5° C. Every few degrees the mixtures were stirred with a thermometer and (having been kept at a constant temperature for one minute) a drop removed and examined under the microscope. Approximately the same results were obtained.

From this list it will be seen that potato starch is very readily affected by heat; in point of fact, its granules are freely acted upon when action has scarcely begun in those of the others. Bakers seem to be aware of this, and hence use mashed potatoes to make their ferment, and they say wheaten flour would not answer alone. The more tumefied potato starch is more susceptible to the yeast than the less tumefied wheat starch.

The next point to be noticed is that although starches as a rule seem to vary but slightly in their behaviour to hot water, the three principal varieties of Maranta show marked differences. At first it was thought this might be accidental to the special specimens under examination, so samples from various museums, wholesale houses and private sources were treated in the same manner with almost constant results.* Subsequently, my attention was directed to a paper, by that veteran pharmaceutical microscopist, Mr. Greenish, published in the 'Year-Book of Pharmacy' for 1875, page 534, in which comparatively the same results were chronicled. The samples of starches which I examined, obtained from such various sources, were probably representative of the crops of different years, and, this added to the fact that my results were approximately the same as those obtained by Mr. Greenish seven years previously, doubtless also from many samples representing different years' growth, seems to show that this difference in the tumefying points of these varieties of Maranta arrowroot is a constant characteristic.

It is quite possible the cause may be found in the temperature under which the plants bearing them are grown. The higher that temperature, the higher the point of tumefaction. A glance at the following table will suffice to support this view:—

District.	Latitude.	Longitude.	Rain fall per annum	Temperature.			Tumefying points
				Max.	Min.	Mean.	
Natal	30°·40′ S.	29°·55′ E.		27° C.	13° C.	20° C.	70° C.
Bermuda ..	32°·20′ N.	64°·50′ W.		30° ,,	10° ,,	22° ,,	73° ,,
St. Vincent.	13°·15′ N.	61°·15′ W.	76ins	31° ,,	21° ,,	26° ,,	77° ,,
British Guiana	4°·40′ N.	59° W.	74ins	33° ,,	24° ,,	28 ,,	78° ,,

Furthermore, potato starch, from plants grown in England, where the mean temperature is under 9° C., tumefies at 65°. Tous-les-mois (which has larger granules, and, therefore, other circumstances being equal, might be expected to be more easily tumefiable), grown at St. Kitts, lat. 17° 22′ N., long. 62° 48′ W., mean temperature about 24° C., tumefies at 74° C. Maize starch may likewise be compared with wheat in the same way. But cassava and oat starch are exceptions; these, however, occur as compound granules, whereas all those previously mentioned are simple.

It is proposed to grow potatoes, and other starch-bearing plants, under various conditions of temperature and to ascertain from their examination the results.

Following the example of Lippman and Greenish, the temperature is noted at three distinct stages of tumefaction, viz., when the first few granules swell, when the majority have swollen, and when all have done so. This latter point is synonymous with the formation of a jelly, if the granules are present in sufficient quantity, and is alone given in the above table.

To ascertain if by a prolonged exposure to a lower temperature the same results could be obtained as by a short exposure to a slightly higher temperature, a sample of potato starch was taken (this had been previously found to reach the first stage at 55° C.; the second at 60°; the third at 65°), mixed with ten times its weight of water, placed in a thin test-tube with a thermometer as a stirrer, in a double water-bath; the inner, which consisted of an earthenware vessel, being furnished with a thermometer; the outer, with a simple form of thermostat, so arranged as to keep the inner bath at 60° C.

As I am not aware that so simple an arrangement has yet been published, a description of the Thermostat may not be out of place. It is a modification of Kemp's regulator, and is thus made :—

Two test tubes are selected, one of which is capable of sliding loosely inside the other: the smaller one is heated near its centre and slightly drawn out; it is then severed at the contracted part, the upper half being thrown away, the rough edges

* Except in the case of commercial Bermuda arrowroots, some specimens of which behaved in the same way as St. Vincent arrowroot; but as the same samples showed a marked deficiency in the number of granules with processes, so comparatively abundant in genuine Bermuda, the title Bermuda arrowroot was probably a misnomer.

of the lower half are rounded in the flame. The smaller tube is then inverted in the larger one and

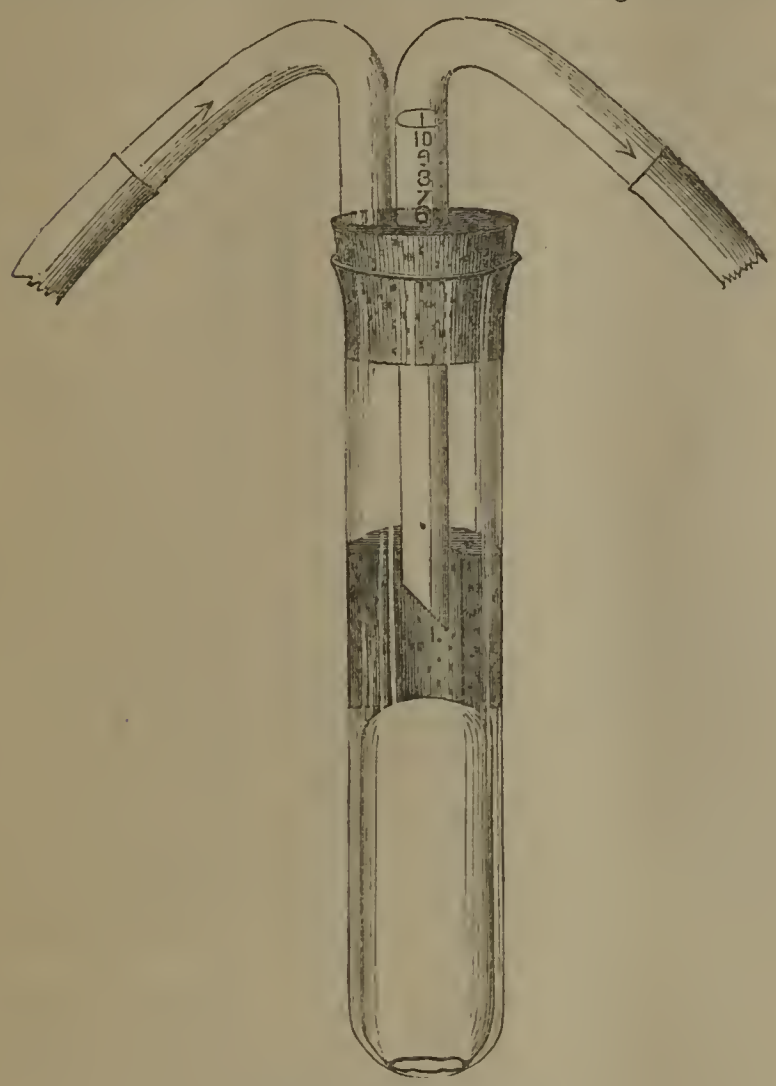

Fig. 2.—Thermostat.

kept in its place at the bottom by means of a cork, in which a fair sized groove has been made, on one side, by means of a rat's-tail file. The mouth of the larger tube is now fitted with a good cork which carries two glass tubes, as large as possible, both tubes being bent at an angle of 45° outside the cork; one terminates immediately inside, the other, which is capable of sliding through the cork, passes down to the bottom of the groove. It should terminate obliquely and have a pinhole, easily made by pressing a needle into it when red hot, about one cm. from its lower end. A mark is made on the tube outside the cork, the tube is then withdrawn until its termination is near the top of the groove, and another mark made; the space between the two marks is to be graduated into ten divisions, this can be done by a paper scale of suitable length, sliding it up the tube until it is between the two marks, where it is kept either by its own elasticity or by means of a minute quantity of sealing wax or gum.

To adjust the instrument, the cork carrying the two tubes is removed, and the test-tube heated to the highest temperature required in use; after about one minute's exposure, mercury is poured in until the groove is completely filled, the cork is again fitted to the test-tube, and the longer tube adjusted so that its mouth is just closed by the mercury; the open end is attached to a Bunsen's burner by means of a caoutchouc tube, the other tube is, in a similar manner, connected with the gas supply. The test-tube is then placed in an oil or water-bath over the Bunsen, and when the flame lowers the temperature is noted; the sliding tube is then withdrawn one division, the operation repeated, and so on, if necessary, for each division on the scale.

In using this thermostat it should be seen that the corks remain in the same position, and that the body heated is sufficiently voluminous, or at such a height above the flame as to allow of the temperature falling when the gas is supplied through the pin hole only. This simple arrangement is sufficiently delicate to keep a water, oil or air-bath within a few degrees of any required temperature, or if a double bath be used and the thermostat placed in the outer, the inner bath will remain constant within 1°.

The value of one division should be found each time of using, as alterations of the barometer may affect it slightly.

The mixture of potato starch and water by the arrangement above described was kept at a temperature within 1° of 60° C. for nine hours. Examination under the microscope during the first few minutes and after the nine hours showed that the starch had not been further altered by the prolonged exposure. The mixture was now diluted with four times its weight of water and a portion of it kept at 60° C. until it had been so heated for forty hours; still no further change. On the temperature being raised to 65° C. most of the unaltered granules tumefied, but it required a temperature of 70° C. to complete the alteration, whereas when a sample of the same starch which had not been so treated was mixed quickly with water of 65° C. the whole of the granules tumefied.

It, therefore, seems that prolonged exposure to a temperature a little below that of tumefaction, not only does not tumefy the granules but enables them to bear a slightly higher temperature than they otherwise would do.

Slow tumefaction might perhaps throw some light on the histology of starch granules; it is, however, quite possible that it may have already been thoroughly studied by some of the German writers to whom we are indebted for nearly all our knowledge on this subject. I notice that when the granules are gradually heated as described above the majority do not burst their integument, by splitting it from the nucleus in all directions, as when they are subjected to a sudden rise of temperature, but a small bladder-like process is thrown out near the nucleus, and if the temperature be kept constant, the swelling increases, although still confined to that portion of the granule, bursts, the granulose oozing out, and, if sufficient time be allowed, the integument, still retaining the original size and shape of the truncated granule, is all that is left.

At the same time other granules having thinner integuments will be acted upon to a greater extent, leaving nothing but a mere cap of cellulose, and in some cases the whole of the integument is completely acted upon, nothing eventually remaining but a mass of jelly.

The swelling of the granulose within the integument of a starch granule has the same effect as an ignited charge in a gun. Suppose a modern cannon, which increases in thickness by successive coils of metal towards its breech, were closed by a stopper of less strength than the barrel of the gun, a charge of suitable power, capable of acting with equal force on the whole surface, having been previously introduced. This being fired, the stopper would give way. If a more powerful charge were used, not only the stopper but the front part of the gun would be carried off; and so on as in the case of the starch granule in which the so-called nucleus represents the closed muzzle, the integu-

ment the cannon, and the granulose the greater or lesser charge, according as it is subjected to more or less heat.

Fig. 3.—Potato starch showing different granules at various stages of tumefaction. The upper four are supposed to be the same granule.

From the action of warm water on starches, that portion of the granule near what is called the nucleus or hilum is shown to be the softest and newest part, and possibly the granule may receive its nutriment through this point. Much opposition has been shown to both the above terms, and if what is surmised above be corroborated by others, then, the term *micropyle* (*Gr.* a little gate or orifice) would more suitably express its probable functions. It may be asked, if the granule is built up by the entrance of nutriment through this micropyle, how is it that, when the starch is used to furnish material for the growth of the plant, it does not send out the granulose through the micropyle, that being the softest part, and leave the celluloidal integuments as a skeleton of the granule? It must be remembered, however, that the protoplasm from which the starch is formed must be diffusible through the primordial integuments which are first "secreted on the inner surfaces of the cavities or vacuoles formed in the general protoplasm of the cell;" but when converted into granulose it is no longer diffusible.

How starch is utilized has not been satisfactorily explained; it was at one time thought that the immediate cause of its transformation into available substances was diastase, but it is now known that diastase exerts no influence on raw starch. Starch has been examined after having passed the alimentary canal of man and other mammals, and it has been observed that the whole surface of the granule is more or less corroded, the action being no more violent at the micropyle than at other parts. Whatever agent is employed in the plant probably acts on the integuments as much as on their contents, the action once begun being most likely very rapid, those granules first attacked disappearing before action has begun on others.

(*To be continued.*)

EXAMINATION OF POWDERED SENNA LEAVES *

BY DR. W. LENZ.

The pharmacist who is not in a position himself to prepare his vegetable powders, or who for other reasons purchases them, in proportion as he is in the habit of conscientiously examining his goods, must have often regretted the want of a suitable method for testing the powders of plants and parts of plants. For the examination of many commercial powders, but especially of condiments, masterly works by Wiesner, Vogl, Müller and others have been published, which in conjunction with characteristic figures, render the microscopic analysis and identification of the constituents of such vegetable powders possible to the expert. But many of the officinal powders most in use are not so well worked out, and some not at all, at least as regards the indispensable figures.

For the examination of a vegetable powder it is requisite to have an exact knowledge of all, or at least of the characteristic cell and tissue forms of the plant or parts of the plant from which it is derived. Such a knowledge can only be attained by a thorough previous examination of authentic entire specimens. Before proceeding to the examination of an undoubtedly pure powder, preferably prepared by the experimenter, it is therefore necessary to acquire by means of sections, a clear idea of the anatomical relations. When the student can recognize and define each cell from the powder, and refer it to the part of the unpowdered drug in which it occurs, he will have attained a general preparation for the testing of commercial powders.

The microscopic examination and discovery of special characters in powdered leaves is rendered more difficult by the fact that leaves in general present a great similarity in structure. The epidermal cells covered by the cuticle are always rounded off parallel to the surface of the leaf, single cells or entire groups being developed into papillæ, hairs, glands and scales; when fresh they contain colourless or coloured cell-juice, which in dried leaves naturally disappears, though it may colour the cell-walls. The peculiar fundamental tissue of the leaf (mesophyll), permeated by vascular bundles, which is enclosed by the epidermis, is formed, as a rule, of two layers; the upper of which consists of cylindrical cells elongated vertically to the epidermis (palisade tissue), and the lower of parenchyma tissue enclosing large intercellular air-spaces. The cells of the fundamental tissue are mostly thin-walled, presenting however, in many leaves, as for instance in tea, especially in the neighbourhood of the vascular bundles, stone cells that may be very characteristic. Moreover in the mesophyll there occur crystals, mucilage, and receptacles containing essential oil, etc. The vascular bundles, the course of which (venation) is so important in the recognition of the entire leaf, afford fewer points for the characterizing of leaf powders than the epidermis and mesophyll.

I. *Folia Sennæ Alexandrinæ.*

This drug consists of the dried pinnate leaflets of *Cassia lenitiva*, Bischoff, free from argol leaves. The leaflets are somewhat leathery, oval, oblong or oblong lanceolate, unequal at the base, broadest in the middle, shortly accuminate, pale greenish with a bluish lustre on both the upper and under surfaces, covered with fine hairs on the under side, especially in neighbourhood of the midrib. The epidermis (fig. 1) of the upper surface resembles that of the under surface in structure, except that thick-walled one-celled hairs (H), inserted in the midst of a group of four to six epidermal cells, occur more plentifully on the under than the upper surface. These hairs are straight or curved, simple, with the canal nearly as thick as the wall; they are brittle and consequently easily detached at the base, so that only the basal portion, forming a characteristic scar (R), remains in

* Abstract of a paper in the *Archiv der Pharmacie*, [3], xx., 106.

the epidermis. Along the midrib occur single thin-walled hairs, which are in some instances five times as long as those represented in the figure. The stomata,

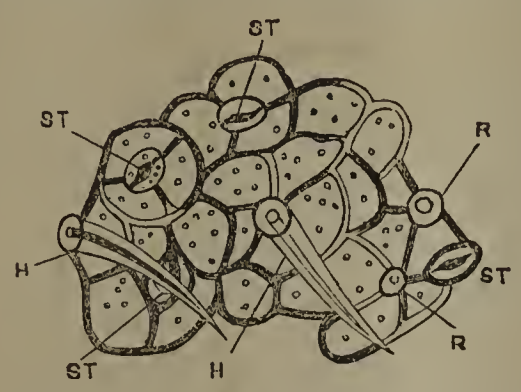

Fig. 1. *Cassia lenitiva*, Bisch.: Epidermis of leaf.—H, hairs; ST, stomata; R, point of insertion of detached hair. 144/1.

which are usually surrounded by a circle of 2 to 4 epidermis cells, occur with equal frequency on the upper and the under surfaces. The epidermis consists of a single cell layer, which, however, is developed somewhat more thickly on the upper surface of the leaf than the under, and occupies (the two layers together) one-third of the diameter of the leaf. Beneath the epidermis, and contrary to the usual rule, near both the upper and lower surfaces of the leaf, lies the palisade tissue, some cells of which, strongly magnified, are represented in fig. 2. This also consists of only one layer of cells, which, however, are notably larger in the layer near the upper surface of the leaf than in that near the under. The thickness of the two layers of palisade tissue taken together amounts to more than one-third of the diameter of the leaf. The contents (fig. 2, B) forming large cylindrical cells standing with their long diameter vertical to the surface of the leaf, are peculiarly shrivelled up, so that they themselves may be taken for thickened cells.

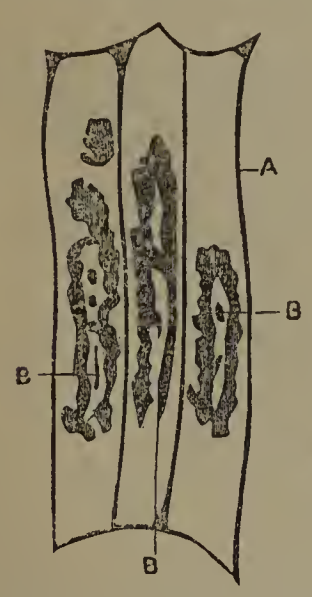

Fig. 2. *Cassia lenitiva*, Bisch.: Palisade tissue of leaf.—A, cell-wall; B, dried up cell contents. 420/1

Fig. 3. *Cassia lenitiva*, Bisch.: Palisade tissue of leaf, seen from above. 144/1

Upon a superficial view, therefore, the palisade tissue presents the appearance of a layer of stone-cells (fig. 3). The middle of the leaf is permeated by an abundant network of vessels, the elements of which, consisting of smooth fibres, spiral and scalariform vessels, as well as parenchymatous tissue, are not specially characteristic. As little characteristic are the large roundish cells of the fundamental tissue, the shrivelled horny contents of which catch the eye whilst the delicate cell-walls are only perceived with difficulty.

For examination, the powder is best boiled with 90 per cent. alcohol, and being thus freed from resin, is brought under the microscope in glycerine. The elements of the vascular bundles stand out prominently; the palisade tissue is characteristic, but so especially are the fragments of the epidermis.] True Alexandria senna is distinguished by the relative abundance of the hairs; the powder should contain, therefore, a corresponding number; if the hairs have been broken off, the fragments of epidermis will exhibit plentifully the unmistakable points of insertion. Frequently a strong preponderance of vascular bundles consisting of large spiral vessels points to a powder containing much leaf-stalk.

II. *Folia Sennæ Tinnevelly.*

This drug, derived from *Cassia angustifolia*, γ *Royleana*, Bischoff, differs from the preceding in the leaves being less leathery, lanceolate, and with fewer hairs. The upper surface of the leaf is yellowish green, the under surface being of a somewhat darker shade. The anatomical structure does not differ essentially from that of Alexandria senna. The epidermis, however, is far less hairy and the hairs do not break off so readily as from the Alexandria variety. In the powder of Tinnevelly senna, therefore, there occur proportionally a much smaller number of the hairs characteristic of the official leaves, and the fragments of epidermis seldom show the corresponding points of insertion of the hairs, represented in fig. 1, R. Further the elements of the vascular bundles are not so prominent in the powder of Tinnevelly as in that of Alexandria senna, and they appear to be richer in spiral vessels.

Whilst Tinnevelly leaves occur very pure in commerce, the Alexandrian leaves mostly contain more or less leaf-stalks and fruit (husks), from which only the "picked" quality (which is probably not used for powdering) is free. These admixtures naturally occur, therefore, in the powder, so that a knowledge of their peculiar elementary forms—which may be looked upon as characteristic of Alexandria leaves—is indispensable in the examination of commercial senna powder.

The epidermal cells of the stalk (fig. 4) are considerably smaller (elongated in the direction of the stalk) than those of the leaf epidermis, and have fewer hairs and stomata. The parenchyma tissue specially distinguishing the stalk shows nearly the cell-form of ordinary cork (fig. 5).

Fig. 4 *Cassia lenitiva*, Bisch. Epidermis of leaf-stalk. 144/1.

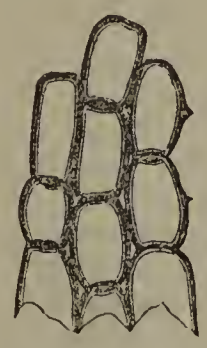

Fig. 5. *C. lenitiva*, Bisch. Parenchyma tissue of leaf-stalk. 144/1.

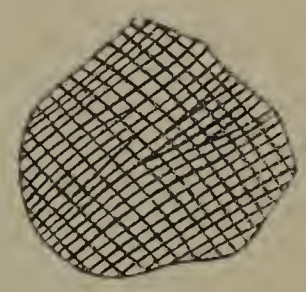

Fig. 6. *C. lenitiva*, Bisch. Middlelayer of the fleshy portion of the husk, seen from above. 144/1.

The epidermis of the husk is remarkably similar to that of the leaf, only the epidermal cells, seen from the surface, appear somewhat more elongated than those of the leaf. Most characteristic of the husk, however, is a tissue traversing about the centre of the fleshy portion and parallel to the walls. This consists of several layers of unthickened, acuminate, tube-shaped fibres, lying one upon another, which in each layer are arranged close together in the same direction, whilst those of the different layers (of which with only a moderate enlargement two can be seen) cross one another at an angle. If the powder contains husk, this tissue (fig. 6) always occurs, and is unmistakable by the most unskilled observer. Frequency of pieces of husk tissue can be taken as indicating a powder prepared from Fol. Sennæ Alex. parv. The fleshy portion lying under the epidermis, outside the fibre layer above described, is not unlike the large-celled parenchyma tissue of the stalk, the inner

portion consisting of larger cells, and therefore possessing more the type of a true fruit flesh. There is nothing characteristic in the cellular layer constituting the inner wall of the fruit. The elementary tissue of the small seeds has never been observed by the author in a powder.

At a first glance the Alexandria leaves appear to contain more woody fibre than the Tinnevelly. A chemical examination made by Dr. Popp of senna powders, prepared by himself, gave the following results:—

1. *Folia Sennæ Alex.*

1·85325 g. lost at 100°–110° C. 0·20925=11·29 per cent. of water.

2·1297 g. (air-dried) exhausted with absolute alcohol gave 0·3995 g. = 18·76 per cent. of resinous residue, dried at 100°.

1·1304 g. (air-dried) gave 0·1189=10·52 per cent. of woody fibre.

2. *Folia Sennæ Tinnev.*

1·8740 g. lost at 100°–110° C. 0·1800=9·6 per cent. of water.

2·2426 g. (air-dried) exhausted with absolute alcohol, gave 0·4280 g. = 19·09 per cent. of resinous residue, dried at 100° C.

1·2073 g. (air-dried) gave 0·1400 g. = 11·59 per cent. of woody fibre.

The opinion that Alexandria leaves contain more woody fibre than Tinnevelly, was consequently not confirmed; the evidence was rather that upon the basis of a determination of moisture, resin and woody fibre, the two kinds of senna leaves cannot be distinguished.

QUININE IODATE AND BROMATE, AND THE PHYSIOLOGICAL ACTIVITY OF SUPEROXIDIZED MOLECULES.*

BY CHARLES A. CAMERON, M.D.

The researches of Arthur Gamgee, Priestly, and Larmuth have shown that the three forms of phosphoric acid and of vanadic acid have very different degrees of physiological activity. The salts of orthophosphoric acid are almost inert when their bases are inactive, whilst the pyrophosphates and metaphosphates are poisonous. The orthovanadic acid is poisonous, but pyrovanadic acid and metavanadic acid are still more poisonous.

The high physiological activity of the pyro and metaphosphates has been attributed to the unsaturated condition of their nuclei. These salts are not statical, for they can take up additional basic material. For example, calcium metaphosphate can combine with two molecules of lime to produce a molecule of calcium orthophosphate—

$$Ca(PO_3)_2 + 2\,CaO = Ca_3(PO_4)_2.$$

Carbon dioxide and carbon monoxide are poisonous, but the latter is by far the more poisonous. According to the modern doctrine of atomicity carbon atoms have four "bonds"—that is, a carbon atom has an atom-fixing power equal to that of four atoms of hydrogen or other monad elements. In carbon dioxide the four bonds of the carbon atom are fully satisfied by the four bonds of the two oxygen atoms—

$$O=C=O$$

In carbon monoxide only two of the carbon atom bonds are in combination with oxygen, and the remaining bonds combine with each other—

$$\text{‹}C=O.$$

Such a molecule is said to be unsaturated.

High Molecular Weights a cause of Physiological Activity.—High atomic weight and complex molecular structure are stated to be causes of high physiological activity. The poisonous elements have as a rule higher atomic weights than elements belonging to the same groups which are comparatively physiologically inert. There are, however, exceptions to these rules. Lithium with an atomic weight of 7 is more active than sodium with an atomic weight of 23. Arsenic with a lower atomic weight than antimony is more poisonous than the latter. Chlorine in the free state is more active than iodine, though on the whole the iodine compounds used in medicine have somewhat smaller doses than the corresponding chlorine compounds.

Rabuteau found that with one exception (that of methyl alcohol) the toxic power of the alcohols increased with their molecular weight. Amyl alcohol, which has a molecule composed of 18 atoms, is eight times more poisonous than ethyl alcohol, the molecule of which contains 9 atoms. On the other hand, oxalic acid has a molecular weight of 90, and is poisonous, whilst malic acid, with a molecular weight of 134, is a constituent of wholesome fruits. Albumin has a very high molecular weight.

Superoxidized Bodies.—Physiological activity seems to be more influenced by an unsaturated condition of molecules than by their molecular weight or degree of complexity. It is also, I am disposed to believe, influenced by a condition of molecules which I venture to describe as *superoxidized.* In potassium iodide we have according to the doctrine of quantivalency a saturated molecule. The salt is composed of two monad elements, and the unit of equivalence of each of its two atoms is fully satisfied. According to the graphic or pictorial method of representation the molecule is constituted as follows—

K—I.

Although potassium iodide is a saturated and stable body, three or four atoms of oxygen may be combined with it so as to form potassium iodate (KIO_3) or potassium periodate (KIO_4). In the latter salt only two of the atoms of oxygen are in union with the potassium and iodine, six oxygen bonds satisfying each other—

K—O—O—O—O—I.

In this compound there are three atoms of oxygen in excess of the number requisite to saturate the iodine and potassium; hence we may term potassium periodate a superoxidized compound.

Periodic anhydride is a more striking example of a superoxidized body. It is composed of two atoms of iodine combined with seven of oxygen—

I—O—O—O—O—O—O—O—I.

In this compound only two of the fourteen oxygen bonds are in combination with the iodine.

It may of course be said that iodine is a septivalent element, but in atom-fixing power it acts in general like other monads.

If we hold that iodine and bromine are monads, then the higher terms of their oxygen series may be regarded as in reality unsaturated molecules. They contain oxygen atoms combined only with other oxygen atoms. Such compounds are unstable. They are all decomposed by simple heat at comparatively low temperatures.

When superoxygenated compounds are introduced into the system, it might be expected that their oxygen being loosely combined would unite readily with elements of the blood. It is, however, stated that potassium chlorate passes through the body unchanged. It is open to doubt whether or not the whole of the chlorate taken appears subsequently in the urine. It has been alleged that quinine passes unchanged through the body, but it is now known that only two-thirds of the quinine taken into the stomach can be detected subsequently in the urine. Even if all the potassium chlorate taken were found afterwards in the urine, that would not be positive proof that the potassium chlorate had not been partially deoxidized and reoxidized in its passage through the system. Besides drugs produce powerful catalytic effects without undergoing themselves any chemical changes.

Potassium iodate appears to act more powerfully upon the system than potassium iodide. I know a person,

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* Read before the Medical Society of the King and Queen's College of Physicians, Wednesday, May 3, 1882. Reprinted from *The Dublin Journal of Medical Science*, June, 1882.

accustomed to take ten grain doses of potassium iodide without experiencing any unpleasant symptoms, who cannot take even five grains of the iodate without being attacked by coryza.

I am disposed to believe that the chlorates, bromates, and iodates are more active physiological agents than the corresponding chlorides, bromides, and iodides. They are all composed of superoxidized molecules. It is certain that chlorate of sodium is more powerful than chloride of sodium, or common salt. We may from analogy infer that iodate of potassium is a more active physiological agent than the iodide of potassium.

Ferric Iodate.—Some years ago I suggested the use of ferric iodate ($Fe_2(IO_3)_6$) as a substitute for the unstable ferrous iodide.* It was largely prescribed in Dublin, and although a nearly insoluble salt it was found in large doses to produce iodism. It was favourably noticed by Dr. Anstie in *The Practitioner* for June, 1869, page 366.

Quinine Iodate.—Last year I gave a formula for the preparation of iodate of quinine, in combination with an effervescing preparation, to Messrs. J. J. Graham and Co., of Westmoreland Street, Dublin, and since last May they have, as they inform me, disposed of nearly 1 cwt. of the compound. It has been prescribed largely by Mr. Porter, Surgeon to her Majesty; Dr. Samuel Gordon, Professor Moore, Dr. Smyly, Professor Macnamara, and many other leading practitioners. These gentlemen inform me that they have found it a very useful remedy in the treatment of neuralgia, severe articular pains which had resisted the employment of the usual remedies, sluggish forms of pulmonary congestion, secondary syphilitic disease, and malarial enlargement of the spleen.

Iodate of quinine is a salt which appears to have been scarcely studied. Only two references to its existence are to be found in the books and journals relating to chemistry and pharmacy. Sérullas states (*Annales de Chimie et de Physique*, t. xlv., 282) that it may be prepared by dissolving quinine in a hot solution of iodic acid, and that on cooling the solution the salt crystallizes out in a form resembling sulphate of quinine. Sérullas does not appear to have analysed the salt. According to Pelletier and Caventou (*Annales de Chimie et de Physique*) both iodate and hydriodate of quinine are formed by digesting quinine and iodine by the aid of heat.

Quinine iodate may be prepared by digesting freshly precipitated and still moist quinine with a warm solution of iodic acid in the proportion of a molecule of each (the iodic acid should be dissolved in 8 or 10 parts of water). The resulting mass cannot be dried at the water-bath heat, as it causes some decomposition of the salt. Dried at a temperature of 60° F., and then placed *in vacuo* over sulphuric acid, it undergoes no further loss of weight. The salt has a white-pearly appearance, and consists of extremely minute needle-shaped crystals, which contain no water. Boiling water does not decompose it. It is very slightly affected by strong sulphuric acid. Hydrochloric acid and dilute sulphuric acid dissolve it readily; it is not quite so soluble in acetic acid. Spirit of wine effects its solution readily, but in ether and chloroform it is sparingly soluble. Seven hundred parts of cold water dissolve 1 part of the iodate; in warm water it dissolves much more readily.

The mean of several determinations of the amount of iodine in the dried iodate of quinine gave 21·8 per cent. The salt has therefore the following formula:—

$$C_{20}H_{24}O_2N_2,HIO_3.$$

The theoretical amount of iodine for such a formula is 22·92, but the small deficiency in the salt was due to the presence of a little free quinine; the iodate was found to be faintly alkaline from this cause.

The granulated effervescing iodate of quinine is composed of a mixture of the pharmacopœia compound of sodium bicarbonate and citric and tartaric acids with the iodate. Each drachm of the compound contains 2 grains, or 1 dose of the iodate.

I have not made many examinations of the urine of persons under administration of quinine iodate. In the case of a patient of Dr. Elliott, who was using the iodate for about a fortnight, the urine contained so much free hydriodic acid or iodides that it gave a yellow precipitate with nitrate of lead. In another case iodic acid and hydriodic acid were detected in the urine within half an hour after the iodate had been taken, but no trace of quinine could be found in it. In the urine of the same person, passed three hours later, quinine was found.

Bromate of Quinine ($C_{20}H_{24}N_2O_2,HBrO_3$).—I can find no account of this salt in the chemical books or journals. So far as I am aware it has not been described up to the present. It may be prepared by precipitating barium bromate by sulphate of quinine, or by neutralizing quinine with bromic acid. It occurs when air-dried in small asbestos-like masses, which, under the microscope, are seen to consist of very long needles.

Quinine bromate has the same constitution as the iodate of quinine, but it is more soluble in water—namely, 1 part in 250. Warm water dissolves it freely. The dry salt may be heated on the water-bath without discoloration, but its solution, when evaporated to dryness, leaves a residue more or less decomposed. The salt dissolves readily in hydrochloric and dilute sulphuric acids, and in spirit of wine. Acetic acid acts less readily upon it. Touched with a drop of strong sulphuric acid it detonates, emits a puff of dark smoke, and almost wholly disappears. On iodate of quinine, sulphuric acid produces only a slight yellow coloration, which vanishes on the addition of water, the salt dissolving and forming a colourless solution.

The original paper is supplemented by the medical opinions of a number of physicians who state that they have found the quinine iodate and bromate valuable remedial agents.

* *Dublin Quarterly Journal of Medical Science*, May, 1869, vol. xlvii., p. 354.

HYDROBROMIC ACID.*

BY G. R. TUCKER, PH.G.

The credit of having introduced hydrobromic acid as a medicine is generally given to Dr. J. Milner Fothergill, who extolled its virtues in the *British Medical Journal*, and gave a process for its preparation, viz.: by the decomposition of potassium bromide by tartaric acid.

Dr. De Witt C. Wade has also written much of value on the subject, and in the *Peninsular Journal* for February, 1875, gave an account of its action, and a formula for its preparation, correcting certain inaccuracies in that of Dr. Fothergill. This acid is now quite extensively used, and is considered of sufficient importance to merit a place in our next Pharmacopœia. It is certainly desirable to have a process that will not be too difficult of execution, and one yielding uniform results, of such purity as we expect to find in pharmacopœial products.

In regard to the formula of Dr. Wade, all that can be said in its favour is simplicity. If correctly proportioned, we can perhaps avoid either excess of bromide or of tartaric acid, but we always get a not inconsiderable amount of potassium bitartrate along with it.

Methods have been proposed to obviate this objection, the most successful being that proposed by Dr. Charles Rice, which consists in precipitating the cream of tartar by alcohol. This yields a reasonably pure product, but detracts from the simplicity for which the process has been recommended, making it tedious and expensive. Dr. Rice's formula is as follows:

* Abstract of a thesis presented to the Massachusetts College of Pharmacy. Reprinted from *New Remedies*, April, 1882.

Dissolve 1191 grains of potassium bromide in 15 fluid ounces of water, add 1500 grains of powdered tartaric acid, heat, and set aside in a cool place for twenty-four hours. Thirty-two ounces of alcohol is then added, and the mixture again allowed to rest for twenty-four hours, after which it is filtered, and the alcohol evaporated or recovered by distillation. The product should measure 16 fluid ounces. Sp. gr. about 1·075, containing 10 per cent. of HBr.

Dr. Wade claims that the slight amount of cream of tartar taken up is of no consequence, as it in no way interferes with its medicinal qualities. However true this may have been at the time of Dr. Wade's article, it cannot apply now, in view of the uses to which the acid may be applied, as, for example, in the preparation of hydrobromates of organic bases, which are coming somewhat into use, as hydrobromates of quinia, cinchona, morphia, strychnia, etc.

For the extemporaneous preparations of bromides, there is no process more satisfactory than the saturation of a strong aqueous hydrobromic acid with an oxide or carbonate of the base required. The pharmacist can in this way prepare bromides or hydrobromates, which he may be called upon to dispense, and for which the demand is so slight that it is not an object to purchase.

Various modes of preparation have supplied the market, up to the present time, with acid of various and commonly unknown strengths; hence, as might reasonably be expected, the experiences in regard to its utility are confused and often conflicting. Physicians prescribe such articles and pharmacists buy and dispense them, too often as if there could be but one thing supplied; for example, physicians prescribe hydrobromic acid, not knowing that it may be of any strength from one to fifty per cent., although substituting it for bromide (KBr). It is true that the dose cannot be determined by the quantity of bromine present in the acid, yet there is doubtless some relation which, when studied, forms the basis for its use. It being now generally established that it is the bromine element which is effective in all the bromides, hydrobromic acid should be adjusted in strength, so as to bear some easily remembered relation of its bromine constituent to the potassium salt, this being the one most commonly used.

Potassium bromide contains 67·22 per cent. of bromine; sodium bromide, 71·4; and ammonium bromide, 81·6; that is, 20 grains of the potassium is equal to a dose of 18·8 grains of the sodium, or 16·5 grains of the ammonium salts. Potassium bromide containing in round numbers sixty-seven per cent. of bromine, a solution of hydrobromic acid containing also sixty-seven per cent. of bromine would have the same bromine value.

The most convenient and simple relation is to have an acid of 33·5 per cent. of bromine, or 34 per cent. of hydrobromic acid, or half the strength of the potassium salt; such an acid can be made and dispensed without difficulty, while an acid of 67 per cent. would be inconvenient to dispense, being strongly corrosive, and fuming in the air even more than hydrochloric acid.

This strength is a convenient one to remember, as compared with potassium bromide, being in proportion of two to one. Hydrobromic acid is a sedative neurotic, and its principal use appears to be as a substitute for potassium, sodium and ammonium bromides. It is well known that salts of the alkalies, when given for a long time, are apt to produce undue alkalinity. To correct this, and to forestall against it when likely to occur, this acid finds its principal use. It also acts like other mineral acids in being tonic, refrigerant, solvent, alterative, etc..; combined with quinia, it is said to be very satisfactory in intermittent fever, and has been highly spoken of as a corrective and preventive remedy for headache and ringing in the ears, which often follows upon the use of salts of quinia, called "quinism." Various combinations have been recommended from to time with drugs, such as mercury, stramonium, digitalis, bismuth, pepsin, tartar emetic, etc., but the advantages claimed for these combinations have not been satisfactorily established.

Hydrobromic acid is not, like hydrochloric acid, readily formed by direct union of its elements; mixtures of bromine vapour and hydrogen do not unite by direct exposure to sunlight, nor do they explode when brought into contact with flame, but combination does take place in the immediate neighbourhood of a red-hot wire, when introduced into it, and more quickly when the mixture is passed through a red-hot tube, or by platinum wire, if kept hot by the galvanic current. It is rapidly and copiously absorbed by water, which, when saturated, has a density of 1·29, and fumes strongly in air; this saturated solution boils at a temperature below 100° C., giving off the gas and becoming weaker; a more dilute acid boils at a temperature above 100° C., and a very dilute acid becomes stronger by boiling. The gas is not decomposed by heat alone; potassium introduced into it decomposes it completely, forming potassium bromide, and leaving a volume of pure hydrogen equal to half that of the original gas. Tin produces the same effect when aided by a gentle heat. This reaction can be used to determine the composition of the gas, for the weight of one volume of the gas (the observed sp. gr.), diminished by the weight of one-half the volume of hydrogen, gives a number which is very nearly half the sp. gr. of bromine, 5·54; hence the gas is composed of equal volumes of hydrogen and bromine, united without condensation. The gas or its aqueous solution is immediately decomposed by chlorine, hydrochloric acid being formed and bromine separated, which is recognized by its red colour. Iodine, on the contrary, does not decompose it, hence the affinity of bromine for hydrogen is, under similar circumstances, less than that of chlorine, and greater than that of iodine. The acid is also decomposed by oxygen and by highly oxydized bodies.

Nitric acid separates bromine on heating the liquid, and a mixture of these acids has the power of dissolving gold. Sulphuric acid decomposes it, yielding sulphurous acid, bromine and water

$$2\,HBr + H_2SO_4 = SO_2 + 2\,H_2O + Br_2,$$

with bromic acid it yields water and free bromine.

Many formulæ have been proposed for making this acid for medicinal use, but all so inaccurate, or inconvenient, or difficult, as to be impracticable for ordinary use. The process usually noticed in the older works on chemistry is that of Balard, and as modified by Professor J. M. Maisch, and still farther by Professor G. F. H. Markoe, is on many accounts to be preferred to any that have been proposed. Goebel's process* consists in decomposing a solution of barium bromide by sulphuric acid, but this process, although a good one, is inconvenient, as it renders necessary the previous preparation of barium bromide. Loewig tells us to distil potassium bromide with sulphuric acid; a purer product can be obtained by using phosphoric acid in a concentrated form. If calcium hypophosphite be placed in a retort with water, and bromine added through a funnel-tube, hydrobromic acid will be formed immediately, without the aid of heat; the water, being decomposed, furnishes the hydrogen necessary to convert the bromine into HBr, while the oxygen changes the calcium salt to a neutral phosphate. The proportions are: water, 1 part; bromine, 5 parts; and calcium hypophosphite, 4 parts. Sodium sulphite could be substituted to good advantage, but will require a slight heat. The salt in this case becomes a sulphate, and the proportion would be: water, 1 part; bromine, 3 parts; sodium sulphite, 6 parts, yielding 10 parts of acid. In making monobromated camphor, one-half the bromine is converted into HBr, and may be readily obtained as such by passing the gas into water.

A new method has been developed from the known fact that bromine associates itself with certain organic bodies at ordinary temperatures, and is again liberated

* *New Rem.*, 1880, 262.

on heating in form of hydracids; essential oil of copaiba and lemon have been used as a medium for this purpose.

A very interesting and instructive process is that by which hydriodic acid is prepared, and with a modification noticed in *New Remedies*, 1880, page 5, answers admirably for hydrobromic acid. When hydrosulphuric acid is passed into iodine or bromine, hydriodic or hydrobromic acid is formed and sulphur precipitated; when iodine is used, the sulphur persistently envelopes it, preventing further action; but if carbon disulphide be used, this difficulty is entirely obviated, it being a solvent for iodine, bromine, and sulphur. The most suitable proportions are: carbon disulphide, 3 parts; bromine, 2 parts; distilled water, 8 parts; yielding an acid of about the sp. gr. 1·090.

Dissolve the bromine in the carbon disulphide, pour this solution into a tall glass cylinder, cover it with the water, and then by means of a delivery tube, reaching to the bottom of the cylinder, pass a stream of sulphuretted hydrogen to the liquid, till the bromine is all converted into hydrobromic acid, which will dissolve without loss in the water. The reaction is known to be finished when the liquid loses its deep red colour. Then separate the aqueous solution of HBr; boil to expel sulphuretted hydrogen and filter. The rationale is extremely simple, the reaction takes place when sulphuretted hydrogen comes in contact with bromine; one equivalent of hydrogen unites with one of bromine to form hydrobromic acid, while the sulphur with which it was combined is isolated, and remains dissolved in the carbon disulphide. In the report compiled by Dr. Charles Rice, on the Revision of the United States Pharmacopœia, a place is given to the process of Dr. Squibb, but it is yet to be decided whether that or the excellent process of Professor Markoe will be adopted. In 1875, Professor Markoe introduced his process, which has been extensively used, as it is by far the most economical and especially adapted to manufacture on a large scale. The mode of procedure is as follows: One pound of phosphorus is placed in a one-gallon jar (stoneware), covered with water, and the jar half filled with ice, a large funnel is then inserted into the throat of the jar, and a funnel tube adjusted so as to reach a short distance above the phosphorus, the funnel is filled with ice, and the apparatus placed in a vessel, that the jar may be surrounded with ice; three or four pounds of bromine may now be very slowly added through the funnel tube, waiting after each addition until the reaction has ceased; large quantities would give rise to an explosion. The two elements unite to form pentabromide of phosphorus, PBr_5, and this reacting with water, forms phosphoric and hydrobromic acids:

$$PBr_5 + 4H_2O = H_3PO_4 + 5HBr.$$

After the reaction is completed, the excess of phosphorus is removed, and the aqueous liquid distilled until hydrobromic acid ceases to come over. The syrupy residue left in the retort, when properly diluted, is utilized as phosphoric acid. It usually happens that this residue is coloured from impurities, but it can easily be rendered perfectly colourless by heating for a short time with nitric acid, being careful to expel all the excess of acid before diluting. As a practical point in the manufacture of phosphoric acid, Professor Markoe has recommended to add to the mixture of phosphoric and nitric acids small quantities of oxalic acid; on coming in contact with hot nitric acid, oxalic acid splits up into carbonic acid and carbonic oxide. By this means we can get rid of all excess of nitric acid at a comparatively low temperature and avoid the danger of converting a portion of the product into metaphosphoric acid.

To successfully manufacture hydrobromic acid by this process is a matter of the greatest ease when one is familiar with it. The most that can be said against it, is that the addition of large quantities of bromine is tedious; this is obviated in a measure by using a stoppered glass globe in place of a funnel tube.

Professor Markoe has lately modified the process as here given, and is at the present time conducting a series of experiments, to adapt it to the pharmacopœia. From remarks by Professor Markoe I gather the following information: Bromine, although insoluble in water, readily dissolves in hydrobromic acid, in proportion as the acid is weaker or stronger; if we start with water, it will be necessary to first form a small quantity of hydrobromic acid by slowly dropping bromine upon phosphorus covered with a little water, after which we can convert any quantity of bromine into hydrobromic acid with great rapidity and perfect safety, no more apparatus being required than a glass flask.

There is, of course, a limit to the quantity of bromine that can be added, but only by the liquid becoming saturated with the gas. To determine this limit I placed two ounces of phosphorus and 500 c.c. of water in a glass flask, then added drop by drop two or three grams of bromine, after which it was a matter of the greatest ease to introduce the remainder of the bromine, by pouring off the acid liquid and shaking with fresh portions of bromine after each addition. The quantities dissolved by the acid liquid showing a gradual increase, until finally I could add 150 grains of bromine at each time, the reaction proceeding quietly, with an increase of temperature. It required 732 grams of bromine to saturate the liquid, resulting in a highly corrosive and fuming acid.

By heating in a flask connected with a delivery tube, the excess of gas is driven off and absorbed by distilled water. The remaining acid is then transferred to a retort and can be distilled unchanged. Specific gravity 1·4832, containing about 48 per cent. of HBr.

Dr. Squibb has overcome the difficulty of distilling hydrobromic acid made from potassium bromide by sulphuric acid, by allowing the potassium sulphate to crystallize out. This is more readily accomplished if an excess of sulphuric acid is used. However carefully the distillation may be conducted, the product always contains noticeable quantities of sulphurous and sulphuric acids. In my opinion, the process is far more difficult and tedious than that of Professor Markoe's, and certainly yields no better results.

If a large quantity of concentrated hydrobromic acid is to be distilled at one time, I have found it advantageous to use a small retort, arranging the bulk of acid in such a manner that it will flow into the retort only as fast as it distils over. In this way I have been able to distil from a quart retort two or three gallons of strong hydrobromic acid, with only the heat of a Bunsen's burner.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from Vol. XII., page* 827.)

INFUSUM CINCHONÆ RUBRÆ (*Infusion of Red Cinchona*).

Red cinchona, containing at least 6 per cent. of alkaloids, in fine powder . . .	15
Normal hydrochloric acid	5
Water to make 200.	

Macerate the cinchona with the acid and a little water for several hours, occasionally stirring, until the froth has disappeared. Pour the mixture into a percolator closed with a linen pellet at the bottom. As soon as the liquid begins to run clear, pour water on top until 200 parts of filtered liquid are obtained.

The infusion is clear, of a reddish-yellow colour, and should yield a copious precipitate both with solution of soda and with strong hydrochloric acid. (De Vrij.)

MAGNESII METATARTRAS (*Metatartrate of Magnesium*).

Metatartaric acid (see next)	10
Distilled water	40
Magnesium carbonate, about	7
Alcohol	q.s.

Dissolve the acid in the water, and add, under stirring,

* From *New Remedies*, April, 1882.

so much carbonate of magnesium as may be required to be in slight excess. Filter the solution immediately, and add to the filtrate double its volume of alcohol. When the precipitate has settled, pour off the alcohol, spread the magma upon a plate of glass or porcelain, and let it dry in a cool place.

Metatartrate of magnesium is an amorphous, not hygroscopic salt, which may easily be converted into a white powder and is soluble in four parts of water. When dissolved in water it soon is converted into ordinary tartrate of magnesium, and, therefore, it should not be kept in stock in solution.

ACIDUM METATARTARICUM (*Metatartaric Acid*).

Tartaric acid, in powder	q.s.

Heat it in a porcelain capsule, upon a sand-bath, to 180° C. (356° F.); pour the melted mass, by means of a warmed glass-rod, in drops, upon a glazed plate, and transfer the pieces immediately, when cold, in a well-closed bottle.

Metatartaric acid appears in form of transparent, yellowish pieces, having an agreeable acidulous taste, and being hygroscopic.

When dissolved in water, the acid is soon converted into normal tartaric acid, particularly if the solution be warmed.

MISTURA ANTICARRHALIS (Hufeland's) (*Hufeland's Catarrh Mixture*).

Extract of carduus benedictus	3
Extract of dulcamara	1
Fennel water	24
Cherry-laurel water	3

Mix them.

N.B.—Extract of carduus benedictus and extract of dulcamara are prepared thus: pour as much boiling water upon the finely-cut plants (dry or fresh) as is required to make a pulp, set aside for twenty-four hours, occasionally stirring, then express. Again pour on a somewhat smaller quantity of boiling water, let stand twelve hours and express. Evaporate the united liquids to a thick extract.

Cherry-laurel water (*Pharm. Neerlandica*) is prepared by distilling six parts of cherry-laurel leaves with enough water to obtain *at first* five parts, a portion of which is to be assayed for the amount of hydrocyanic acid present, after which the remainder is to be diluted with distilled water, so that 1000 parts of the finished preparation may contain 0·839 parts of hydrocyanic acid, or so that one part of hydrocyanic acid is contained in 1191 parts of the liquid.

MISTURA ANTICHOLERICA (Blecker's) (*Blecker's Mixture*).

Aromatic wine of opium	2
Oil of peppermint	1
Spirit of ether	4
Water	750

Mix then.

N.B.—Vinum opii aromaticum corresponds to the vinum opii of the U.S. Ph.

Spirit of ether is the continental modern form of Hoffmann's anodyne, prepared by mixing equal parts (by weight) of ether and alcohol (*Pharm. Neerlandica* and *Codex*) or one of ether and three of alcohol (*Pharm. Germ.*), etc.

MISTURA BALSAMICA (Choppart's) (*Choppart's Balsamic Mixture*).

Spirit of nitrous ether	1
Balsam of copaiva	8
Alcohol (stronger)	8
Spear-mint water	8
Orange-flower water	8
Syrup of orange peel	8

Mix them.

The original prescribes aqua menthæ crispæ, for which spear-mint water is the nearest substitute.

OLEUM BETULÆ RECTIFICATUM. OLEUM RUSCI. (*Rectified Oil of Birch. Oil of Birch Tar.*)

Oil of birch tar is a red-brown, volatile oil, of a specific gravity of 0·800–0·987, soluble in an equal weight of alcohol, and imparting an acid reaction to water, after being shaken with it. It has the odour of so-called Russia leather, which is, in fact, due to it.

OLEUM CADINUM (*Oil of Cade*).

Oil of cade is a brownish or dark-brown, clear, viscid oil, obtained by the dry distillation of the wood of *Juniperus Oxycedrus*, L.

The oil has a peculiar tarry odour, and an empyreumatic, bitter taste. It is readily inflammable and has an acid reaction. It is insoluble in water, but soluble in ether, chloroform, bisulphide of carbon, and amylic alcohol.

OLEUM MORRHUÆ IODOFERRATUM (*Cod Liver Oil with Iodide of Iron*).

[Oleum jecoris aselli cum iodeto ferrico.]

Iodine, in powder	5
Iron, in powder	10

Pour the cod liver oil into a dry flask, which must be completely filled thereby, close it well, and dissolve in it the iodine, frequently shaking. After the solution has stood at rest for some time, and has acquired a specific gravity of 0·932 to 0·937, add the iron, and shake the mixture, until it has assumed a purple-violet colour and no longer imparts a blue tint to a dilute solution of iodide of potassium with gelatinized starch. Agitate the mixture occasionally, during twenty-four hours, then repeat the reaction for free iodine, and, if this appears to be absent, let the oil become clear by standing and transfer it to small amber-coloured vials, which must be completely filled and well stoppered.

The product has a purple-violet colour, a specific gravity of 0·937 to 0·940, and contains about 1·23 per cent. of iodine and 0·27 per cent. of iron.

By shaking with a solution of starch containing some iodide of potassium, the oil should be readily converted into a bright-yellow liquid, free from blue tint or colour.

Twenty grams of the oil, incinerated in a porcelain or platinum crucible, should leave 0·077 gm. of ferric oxide.

If 5 gm. of the oil be saponified with an alcoholic solution of caustic potassa, the soap incinerated, and the residuary carbonaceous matter extracted with water, the aqueous solution, strongly acidulated with hydrochloric acid, should yield, with palladium chloride, a precipitate which, when washed and dried, weighs about 0·087 gm.

OLEUM MORRHUÆ FERRATUM (*Ferrated Cod Liver Oil*).

Benzoate of iron (ferric) (see next) . . .	1
Cod liver oil	100

Dissolve the benzoate of iron, with the aid of a gentle heat, and by frequent agitation, in the oil.

The solution is reddish-brown, clear liquid.

FERRI BENZOAS (*Benzoate of Iron*).

Benzoic acid	10
Water of ammonia	14
Solution of chloride of iron (ferric) specific gravity, 1·480	11
Distilled water	q.s.

Rub the benzoic acid with three parts of distilled water, and add the water of ammonia, or so much of it as is required to produce a neutral solution. Dilute this with seven parts of warm distilled water and filter, if necessary. Precipitate the liquid by means of the solution of chloride of iron previously diluted with 200 parts of warmed distilled water. When the precipitate has subsided, pour off the supernatant liquid, collect the precipitate on a strainer, and wash it with distilled water until the washings are no longer rendered cloudy by nitrate of silver. Finally dry the salt at a temperature of about 30° C. (86° F.).

The resulting salt is a flesh-coloured powder, odourless and tasteless, insoluble in water, losing 4·5 per cent. in weight by drying at 100° C. (212° F.), and containing about 15·5 per cent. of iron.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JULY 1, 1882.

THE ROYAL COMMISSION ON THE MEDICAL ACTS.

The Report of the Commissioners appointed last year under Her Majesty's Royal Sign Manual to inquire into the grant of Medical Degrees has just been presented to Parliament and published. From it we learn that the Commission has held forty meetings, at which all the subjects committed to it for consideration have been inquired into. Witnesses have been examined; written communications have been obtained from various persons, and from the Universities, Medical Colleges and other bodies in the United Kingdom which grant medical degrees, memberships, fellowships, licences and other diplomas; books, documents, papers, records and Acts of Parliament have been examined, as well as the several Bills relating to medical reform which have been from time to time presented to Parliament with a view to legislation on this subject, and the evidence given before the Select Committee of the House of Commons appointed in 1879 and 1880 to consider certain of those Bills. The Report itself is signed by all the eleven members of the Commission, and it is divided into nine sections, which severally deal with the Grant of Medical Licences; The General Medical Council; Courses of Education; Courses of Examination; Grant of Medical Degrees, etc., by Universities and other bodies; Privileges of Registered Practitioners and Restrictions imposed upon Practitioners not Registered; Positions of Medical Practitioners holding Foreign and Colonial Diplomas; Conditions of Registration and Removal from the Register; and lastly, the Medical Act, 1858, and the Acts amending it.

Starting with the assumption that the Act of 1858 was passed rather in the interests of the general public than with a view to protecting the separate interests of the medical profession, the first section of the Report refers to the defects of the present licensing system resulting from the number of licensing bodies and from the differences in the character of their examinations, especially drawing attention to the circumstance that nearly all of them grant diplomas in medicine alone or surgery alone, although there is no point of medical reform on which there is such a general agreement as that the holding of a medical licence ought to imply the possession of a complete qualification for practice in all the three essential branches of medicine, surgery and midwifery. It is considered that the majority of the licensing authorities have shown a praiseworthy readiness to introduce improvements and that in most cases their examinations have been improved, but that in regard to some the possession of a diploma affords no such guarantee that its holder has a competent knowledge of medicine, surgery and midwifery as the Commission considers to be indispensable. In regard to this point it is considered that the only mode of duly ensuring such a standard of proficiency is by reducing the number of licensing authorities. It is therefore proposed that there shall be in each of the three divisions of the United Kingdom a Board, representing all the medical authorities of the division, for the purpose of conducting examinations for licence, subject to the general control of the Medical Council. It is proposed that each divisional board should contain one or more delegates of each chartered university or medical corporation, either existing or hereafter created, and the certificate of that board is to be necessary for admission to the Medical Register. Each divisional board is also to appoint members of the Medical Council and examiners; to regulate and supervise the courses of professional study and examinations; to keep a register of medical students in the division, and to report to the Medical Council, annually, on their general proceedings, as well as on the results of the examinations.

In speaking of the Medical Council the Report states that it is clearly proved to have rendered valuable services to the profession and to the public, notably in having brought about the universal adoption of a preliminary examination for intending medical students, and in the belief that there ought to be a supreme controlling authority in regard to medical licensing, the Commission proposes to entrust to the Medical Council larger powers than it has hitherto possessed. It is suggested that this Council shall be the sole licensing authority, and that it shall consist of eighteen members chosen for five years and eligible for re-election, six to be nominated by the Crown, two elected by registered members of the medical profession resident in England, one by the members in Scotland and Ireland, respectively, four by the English Divisional Board and two by the Scotch and Irish Boards respectively.

As regards the direct representation of the profession upon the Medical Council, the Commission recognizes the vital interest of the whole medical profession in the constitution of that body, while it insists that the interest of the public is the reason of its existence, and for the sake of better securing the full and complete confidence of the profession in the Council, it is deemed advisable to give the general practitioners an effective voice in it instead of only the governing bodies of the Medical Corporations, which can hardly be said to represent the great majority of practitioners. But while the Medical Council would thus be the supreme medical authority, exercising a general control over everything relating to medical licensing, it is not intended that the Council should be the executive or even the initiating body in questions relating to medical education and examination. The regulation of these

matters would originate with the divisional boards, which would also be the executive bodies for administration. At the same time it would be in the power of the Council to inform the divisional board as to such conditions of educational examination as in its opinion ought to be of universal obligation throughout the United Kingdom, and when proposals of the Board are submitted for approval the Council should have power to vary them. It is not proposed to interfere with the administrative functions hitherto discharged by the Medical Council in connection with the Medical Register and the Pharmacopœia.

In regard to courses of education the Commission considers it would be a mistake to introduce absolute uniformity. Being anxious not in any way to diminish the interest which teaching bodies now take in medical education, or to lessen their responsibility in that respect, the Commission desires to leave them as much initiative as possible, and it holds the opinion that nothing should be done to weaken the individuality of the universities and corporations or to check emulation between the teaching institutions of the country.

As the details of courses of examinations are in a great measure dependent upon the adoption of the Commission's recommendations, they do not receive much notice in the Report, but it is especially mentioned that every intending medical student ought to pass an examination in general education before entering upon his medical studies, the purpose of this examination being to test the candidate as to the possession of a reasonable amount of general culture. Its subjects should not be of a technical or professional nature, and while care should be taken to prevent its standard being unduly raised or lowered by individual examiners, a sufficient variety of subjects should be included in it to allow of candidates making a selection from them according to their previous education and mental qualifications. According to the recommendations of the Medical Council, every student of medicine is now required to be registered on passing his preliminary examination. The Commission considers that this system should be continued and that the full period of medical study should be passed after the date of registration. It is proposed that this registration of medical students should be placed under the charge of the divisional boards and that it should be obtainable by forwarding a certificate of having passed a preliminary examination as required by the Medical Council. It is considered that there should be power to hold the examinations of the divisional boards at more than one place in each division if that be found desirable, and that while all candidates who pass are placed in one class, the examiners should have power to state that any individuals had passed with distinction. The fees should be such as to cover the cost of the examinations and the other expenses of the divisional boards, and also to provide the sum required to compensate such of the medical authorities as may be entitled to compensation for any pecuniary loss they may sustain by reason of the abolition of their privilege of conferring a licence to practise.

In regard to diplomas and degrees granted by medical authorities in virtue of powers conferred by Royal Charter or Act of Parliament the Commission recommends that the statutory privilege of conferring a medical licence should no longer be attached to them as was provided by the Medical Act, 1858; but it does not propose to interfere with the present powers of universities or corporations to confer these titles, and it deprecates any interference with the examinations of the medical authorities for their higher titles, to which the Commission attaches the greatest value as being the means of encouraging the acquisition of knowledge and skill in the medical profession.

On the subject of the assumption of medical titles by unregistered persons, the Commission is of opinion that the failure of the attempt to deal with the offence by clause forty of the Medical Act of 1858 was chiefly due to the difficulty of defining the offence in words, and not to any neglect of the Medical Council. The Commission also considers it undesirable to attempt preventing unregistered persons from practising, though it holds that they should be prevented from representing themselves as being registered or from assuming titles which would lead the public to believe they are regular medical men. In connection with this subject, it is held that prosecutions for offences under the Medical Act should be undertaken in England by the Public Prosecutor, in Scotland by the Procurator Fiscal, and in Ireland by the Crown Prosecutor, the moneys arising from conviction and recovery of penalties being paid to the Medical Council.

The difficulties arising from the position of registered medical practitioners in the colonies and that of the holders of colonial and foreign medical diplomas in the United Kingdom, and from the necessity of discriminating between the diplomas given by different foreign and colonial universities, are in the opinion of the Commission best dealt with by the Medical Council as proposed in the Government Bill of 1880.

As regards registration under the system proposed by the Commission, it is considered to be unnecessary to maintain more than one Registrar and one office of registration, as heretofore; but the correctness of the register being very important to the public, as well as to the medical profession, it is suggested that every registered practitioner should send annually to the Registrar his address and correct designation, in order to secure retention on the register; the power of erasure from the register for misconduct to rest, as now, with the Medical Council.

As a supplement to the Report and to a very great extent limiting its effect, if not entirely neutralizing it, there are appended a number of memoranda, in which six members of the Commission express their dissent from certain portions of the Report; but we must defer until a future occasion any further reference to these memoranda.

We are pleased to be able to state that Mr. J. C. Thresh, Pharmaceutical Chemist, of Buxton, was a successful candidate in the recent examination for the degree of Doctor of Science in the University of London.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting of this Society was held in the Society's rooms, on Wednesday evening, June 14. Mr. Preston, the President, in the chair.

The minutes of the previous meeting having been read and other business transacted, the President called upon Mr. Dunnil to read a paper on "Dispensing in Sheffield."

Mr. Dunnil commenced by referring to the small amount of dispensing done by the pharmacists of Sheffield, due to the medical men doing their own dispensing. He argued that the explanation sometimes put forward, —namely, that chemists prescribed and that their charges for dispensing are too high,—was insufficient, and that dispensing should be in the hands of the class specially trained to the work and that it should be paid for in accordance with the skill and care involved. Regret was also expressed that there is not greater uniformity in chemists' charges. The author, in conclusion, said he hoped the time was not far distant when all the dispensing would be done by pharmacists, and he was of opinion if it were compulsory that medical practitioners should dispense only in cases of emergency that body would be glad.

In the discussion which followed, which was joined in by most present, the feeling prevailed that better and more uniform prices ought to be obtained, and that dispensing ought to be in the hands of the chemist entirely.

Mr. Ellinor said that the members of the Society had, on several occasions, tried to increase the prices for dispensing, and most certainly the chemist ought to be paid for his labour and his skill; it is not the cost of the articles, but the skill and care required that have to be considered. A query presented itself to his mind in connection with errors in prescriptions, Whose is the responsibility, the writer's or the chemist's? Certainly not the chemist's. The fact of there having been certain prescriptions sent out to chemists, with large doses of medicines ordered, to test if chemists used the full quantity of drugs ordered,—this being done by and with the consent of borough officials, in order to prosecute them, if necessary, under the Adulteration Act,—might be said to prove this? If so, the Adulteration Act relieved the chemist of the responsibility, and he must carry out the directions of the prescription, in order to comply with the Adulteration Act, regardless of the patient being poisoned or injured thereby.

A vote of thanks was awarded to Mr. Dunnil, on the motion of Mr. Furness, for his valuable paper.

Mr. J. P. Hewitt was elected a member of the Society.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, W.C., on Wednesday, June 21, 1882. Present:—Professor Attfield, F.R.S., President, in the chair; Messrs. H. B. Brady, F.R.S., Benger (Honorary Secretary), Carteighe (Honorary Secretary), Chipperfield, Ekin (Treasurer), Groves, Plowman, Southall, Squire, Taylor and Thresh.

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Messrs. O. R. Dawson (Southampton), Kinninmont (Glasgow), Payne (Belfast) and Randall (Southampton).

A grant of £10 to Mr. A. H. Jackson, of Strangeways, to purchase material for an investigation on the Oils of Cinnamon and Cassia was confirmed.

Mr. Chipperfield (Southampton), reported that the preparations of the Local Committee at Southampton were now complete. They had obtained for the meetings of the Conference the use of rooms admirably adapted to the purpose in the Watts Memorial Hall. Twenty-five beds had been secured at Radley's Hotel.

Mr. Chipperfield was thanked for his kindness in attending, and requested to secure, if possible, a larger number of beds at the same hotel.

Letters of thanks for copies of the 'Year-Book of Pharmacy for 1881' were read, from the Royal Society of London, the Pharmaceutical Society of Great Britain, the Hull Chemists' Association and the Sheffield Pharmaceutical and Chemical Society.

The Honorary Secretaries reported that papers had been already promised for the Southampton Meeting, by Messrs. Bransom, Dott, T. B. Groves, R. H. Parker, L. Siebold, Thresh and Dr. Quinlan.

The following eight gentlemen were elected members of the Conference:—Mr. H. B. Blayney, Liverpool; Mr. R. A. Fairclough, London; Mr. J. D. Hazard, Bournemouth; Mr. E. Jones, Hanley; Mr. W. A. McKeown, Belfast; Mr. H. E. Parkes, Hornsey; Mr. J. G. Sangster, London; and Mr. K. Senior, Sydney.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 22. Mr. R. H. Parker, Vice-President, in the chair.

Mr. R. A. Cripps read a paper on the "History of Citrine Ointment," in which he traced the entire history of this preparation up to recent times, giving a full account of the different processes and modifications which have been from time to time proposed.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Alcock, Braithwaite, and Taylor took part.

The Reporter on Botany. Mr. J. O. Braithwaite, then made a Report upon "Plant Movement." The author intends to bring the subject of "Plant Movement" before the Association in two Reports, the first dealing with the researches of Darwin, the second with those of Wiesner. The present paper dealt exclusively with the work of Darwin, of which a full and interesting account was given. The author had himself made experiments upon the circumnutation of certain parts of the plant. Diagrams showing the result of these experiments upon germinating peas, and also upon the shamrock, were exhibited, as were also the plants themselves.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Alcock, Haward, Short, Thompson and Yeatman took part.

The meeting then adjourned.

ROYAL INSTITUTION OF GREAT BRITAIN.

Some of the Dangerous Properties of Dusts.*

BY F. A. ABEL, C.B., F.R.S.

(*Continued from Vol. XII., page* 1066).

The report of Faraday and Lyell was published in the *Philosophical Magazine* for January, 1845, and was followed by a letter from Faraday in the February number of the same publication, in which he referred to the lecture just delivered at the Royal Institution, and made further suggestions with respect to the method of ventilating the mines suggested in the report. But it appears that these publications remained long unknown in France, for in 1855 M. du Souich, Chief Government Mining Engineer of the Saint Étienne arrondissement, when referring to an explosion which had occurred at Firminy, advanced, as new, the view that the deposition of crusts of a light coke upon the props was due to dust which was

* Read at the Weekly Evening Meeting, Friday, April, 28, 1882.

swept up and transported to a distance by the violent current produced by the explosion, and which, being in part inflamed, would carry on and prolong the effects of the fire-damp. The fact that men near the pit's mouth received burns and other injuries, while others who were in workings near the seat of the explosion, but out of the main air current, escaped unhurt, was ascribed by him to this ignition and carriage of flame by dust. Had the results of the explosion been entirely due to the mine being highly charged with gas, the explosion must, he considered, have extended to those portions. On the occasion of two explosions in 1861, M. du Souich again dwelt upon his views regarding the part played by coal dust in increasing the disastrous effects of fire-damp explosions. In 1864–67, M. Verpilleux instituted experiments which led him to the conclusion that coal dust plays an important part in coal mine explosions; the subject was also pursued by several other French mining engineers at about the same time, and especially by M. Vital, who made some experiments on a small scale, in 1875, in connection with an inquiry into the nature and cause of an explosion which had occurred the year before at the Campagnac Colliery, and in a part where no fire-damp had ever been detected. An examination for gas had been made by the overman with a Mueseler lamp just before a shot was fired, and after the first shot, a second shot was prepared, and the fuse having been ignited, the men retreated, when, after a short interval, an explosion took place, and the men stated that they saw a body of reddish flame advancing upon them. After examining the nature of dust collected in the mine, and instituting some special experiments upon a very small scale for the purpose of ascertaining whether, and to what extent, the flame from a small charge of powder was lengthened, when projected, like the flame from a blown-out shot, into air containing fine coal dust in suspension, M. Vital concluded that very fine coal dust, very rich in volatile (inflammable) constituents, will take fire when raised by an explosion, and that portions of the coal are successively decomposed, yielding explosive mixtures with the air, whereby the fire is carried along; the intensity or violence of the burning being much influenced by the physical characters (fineness, etc.) of the dust. He also pointed out that an explosion of fire-damp, while taking place almost instantaneously, inflames or decomposes a small quantity of coal dust raised thereby; explosive action being thus propagated after the fire-damp explosion has ceased. Soon after M. Vital's investigation of the subject, Mr. W. Galloway commenced a series of valuable experiments upon a larger scale, with the view of investigating the influence of coal dust in colliery explosions, and the results were communicated by him to the Royal Society in two papers in 1876 and 1879. The conclusions to which Mr. Galloway was led by the experiments described in his first paper, were to the effect that a mixture of air and a particular coal dust which had been made the subject of chemical examination and practical experiment was not inflammable at the ordinary pressure and temperature, but that the presence of a very small proportion of fire-damp in the air, the existence of which could not be detected with the Davy lamp by the most experienced observer, rendered this dust inflammable, and caused it to burn freely with a red, smoky flame. From this it was inferred that an explosion, when originated in any way whatever in a dry and dusty mine, may extend itself to remote parts of the workings, where the presence of fire-damp was quite unsuspected.

In his second paper, Mr. Galloway shows that the return air of a fiery mine which, though furnishing no indication of the presence of gas when examined in the usual way (by means of a Davy safety lamp), might in his opinion contain from 2 to 2·5 per cent., may be rendered inflammable by suspending coal dust in it. He also described experiments by which it appeared to be demonstrated that the flame produced by the explosion of fire-damp in a particular part of a mine might be propagated, at any rate to some extent, by coal dust raised by the explosion and suspended in the air travelling through the mine, even in the *complete absence* of fire-damp in the air. The apparatus used by Mr. Galloway was constructed on a somewhat extensive scale. In connection with the channel or gallery through which a current of air, with or without coal dust in suspension, was passed, was a receptacle in which a mixture of pit gas (from Llwynpia Colliery) and of air was prepared and exploded. The direct communication between the gas vessel and the gallery (representing a mine way) was only interrupted by a diaphragm composed of from two to six leaves of newspaper; this separator being burst through by the explosion of a mixture of nearly two cubic feet of fire-damp with the requisite proportion of air. The coal dust was placed on the floor of the gallery and upon certain shelves fixed in it. It appeared open to question whether, with the employment of this apparatus, there was not a possibility of very small quantities of fire-damp penetrating, before the explosion, into the gallery from the explosive chamber, through the closing arrangement above alluded to, and whether the results obtained in the gallery might, consequently, be accepted as produced solely by the effect of the concussion produced and flame promoted by the gas explosion in the separate chamber.

In a paper just communicated to the Royal Society, Mr. Galloway argues that any amount of gas which may thus escape into the gallery must be altogether insignificant as regards any possible influence upon the results obtained.

The conclusion now arrived at by Mr. Galloway, as the result of continued experiments with this apparatus, of which he has just given a further account, and of his examination into the effects produced by the Penygraig explosion in December, 1880, and the Risca and Seaham explosions of that year, is confirmatory of that published by him last year, namely, that the very decided view which he first held, "that a mixture of air and coal dust is not inflammable at ordinary pressure and temperature without the presence of a small proportion of fire-damp," has not been borne out by his further experiments, as he considers that he has now shown "conclusively that fire-damp is altogether unnecessary for the propagation of flame with explosive effects by a mixture of coal dust and air," when the scale on which the experiments are made is large enough, and when the fineness and dryness of the dust are "unquestionable."

This conclusion coincides in the main with that arrived at in 1878, as the results of experiments by Professor Freire Marreco, conducted in connection with the North of England Institute of Mining and Mechanical Engineers, which Society, as well as the Chesterfield and Derbyshire Institute of Engineers, has laboured very usefully in this direction cotemporaneously with Mr. Galloway. The most recent conclusions of the latter in respect to coal dust were in fact forestalled by those which the late lamented Professor Marreco in association with Mr. P. D. Morison communicated to the first named Institute in November, 1878, and which were published in its 'Transactions' of that date.

Messrs. Marreco and Morison's experiments were carried out in galleries or long boxes, representing mine workings, though on a smaller scale than Mr. Galloway's later apparatus, and constructed somewhat differently in their details. The apparatus used by them at Harton Colliery (and with which experiments have since been continued by Messrs. Lindsay Wood and G. May) was in fact a double gallery, so arranged that the air current which passed into one gallery made its exit at the end of the second, alongside the point of its first entrance. The mode of proceeding was to fire successively two powder shots, in different positions in the gallery box, from small cannon, so as to represent blown-out shots in the effects produced; coal dust was placed upon the floor of the box, and one shot was first fired against the air current which was passing at a known velocity. The

dust cloud thereby raised was carried along by the current and a second shot was fired into it, and, in a large number of experiments made with many different descriptions of dust, the flame produced by the second shot was increased by that of inflamed dust, a comparatively clear flame being sometimes produced, while in other instances it was accompanied by a shower of sparks. The view taken by Vital, Marreco, and others, regarding the action of coal dust in propagating flame in air free from fire-damp, is to the effect that the first portions of dust acted upon by the inflamed gases of the shot liberate inflammable gas which mixes with the air, and is fired, the non-volatile part of the coal being in part consumed and in part deposited as a feeble coke. Some examination of coked deposits of dust, sent to Marreco subsequently by Mr. Galloway, confirmed the observations originally made by Faraday and Lyell, that the coal dust is in part submitted to destructive distillation during the progress of the flame through the dust-laden air. Marreco considers that, although a proportion of the heat developed by the burning dust is absorbed by the gasification of the coal-constituents, the heat of combustion of these suffices to leave a margin for the carrying on of the action from one particle of dust to another, provided these be in sufficiently close proximity to each other.

In the experiments made by the Chesterfield and Derbyshire Institute of Engineers, in a very long gallery, results were obtained very similar to those of Marreco and Morison, and it was also found that a lengthening of a gas flame, which was placed in the gallery, could be obtained by causing the current of air to carry with it thick clouds of some descriptions of coal dust.

Many instances are on record in this country and others of the firing, with semi-explosive violence, of clouds of coal dust, produced either in the open air, or in localities where no fire-damp could exist, some portions of the mixture of dust and air having come into contact with a flame or fire. Thus Marreco and Morison mention a case of a considerable quantity of coal dust, which had been accidentally thrown over some screens at a pit's mouth, flashing into flame as the dust cloud came into contact with a neighbouring fire, and burning a man very severely; and another accident, which occurred in a stone-drift, where it was believed that no gas could possibly be present. A considerable body of rock was dislodged and coal dust raised by the firing of a shot, the flame of which fired the air-and-dust mixture, with very mischievous results. From 50,000 to 60,000 cubic feet of fresh air were said to be passing through the drift per minute when this accident occurred.

There appear good grounds for believing that, provided coal dust be sufficiently fine and thickly suspended in the air, and of a readily inflammable nature, fire may travel to a considerable distance in the working of a mine, through its agency, in the complete absence of fire-damp. The effects of transmission of flame in this way would be decidedly different, and much inferior in violence, to those produced by an explosion of fire-damp and air, or of a mixture of these with coal dust; the comparative suddenness of the gas explosion would produce greater destruction and less burning effects than the comparatively gradual explosion, or the rapid burning of a dust-and-air mixture. In the latter case, the coal dust will generally be considerably in excess of the air needed for its combustion, so that, however finely divided, much will escape being burned, and may be only very partially coked, and it is conceivable that, as suggested by Mr. Galloway, a second rapid burning or semi-explosion may be caused by the inrush of air, following the first explosion, into the workings which may be thick with heated and only partially burned dust, some of which may still be incandescent.

Considering that, since first Faraday and Lyell directed attention to the dangers of coal dust in mines, its behaviour has been made the subject of many series of experiments and published reports here and abroad, it is remarkable that in most instances of coal-mine explosions, until quite recently, the probable effect of coal dust in increasing their magnitude does not appear to have received the serious attention which it merits at the hands of mine owners and of those in authority connected with coal mines. When the Royal Commission on Accidents in Mines was appointed it collected evidence from H.M. inspectors of mines, from experienced colliery owners and mining engineers, and from selected pitmen, with respect to the causes of accidents, and that evidence included several statements regarding the possible influence of coal dust in aggravating explosions, but the preponderance of opinion of H.M. inspectors was against the view that explosions could originate with, or be to any great extent propagated by coal dust *in the absence* of fire-damp. The only experiment on a practical scale bearing upon the subject which appears to have been made until quite recently is that of Mr. H. Hall, Mine Inspector of the N. Wales, etc., District, who, in firing charges of 4 lbs. of powder from a cannon in an adit driven about 50 yards from the surface in a coal seam on the dip, coal dust being sprinkled upon the floor, obtained flame extending to distances of 30 to 60 yards, while without the dust the flame of the shot did not extend more than 6 or 7 yards.* Some decided opinions were expressed that the supposed influence of coal dust in aggravating explosions was over-rated, and that it would certainly not lead to explosions in the absence of gas. On the other hand, Mr. Galloway expressed a strong opinion that some of the most extensive of recent explosions, such as those at Llan and Abercarne, were at any rate largely contributed to by coal dust, and more recently, on the occasion of the inquiry into the Penygraig explosion, he gave evidence to the effect that the disastrous results of this explosion were mainly if not entirely ascribable to the action of coal dust, supporting this opinion by the results of a minute examination into the condition of the pit, of the sufferers, etc., after the accident.

When the terrible calamity which occurred at Seaham Colliery in September, 1880, was officially inquired into the suggestion was very decidedly put forward by the miners' representatives that the coal dust which existed in large quantities in some parts of the mine, and especially near the spot where it was surmised that the explosion had originated, might have had much to do with the accident. Indeed the opinion was strongly entertained by some that it was entirely due to the ignition of coal dust, in the absence of gas, by the flame from a blown-out shot. The lecturer was consequently requested by the Home Secretary to make experiments with samples of dust collected in different parts of the mine, and the results obtained with them led to an extension of experiments with dust from other collieries in different parts of the kingdom. These experiments, carried to a certain point for the immediate purpose of the Seaham inquiry, have been interrupted for some time, but the Royal Commission has now resumed them with the object of obtaining more precise data in connection with certain results which were elicited by the first part of the investigation.

The earlier experiments were carried on at the Garswood Hall Colliery, where a constant and abundant supply of pit-gas (a so-called blower) is brought to the surface, and was kindly placed at the service of the Commission by Messrs. Smethurst and Co., together with many conveniences, for the purposes of these and other important experiments upon which they have been engaged. The apparatus used at Garswood for the experiments with the Seaham and other dusts, was similar in character to those employed by Freire Marreco, Galloway, and others, great pains being taken to secure accuracy

* Mr. Hall stated that the air in this adit was "practically" free from gas, but did not maintain its *absolute* freedom.

and uniformity in the velocity of the air currents passing through the gallery, in the proportion of pit-gas, or fire-damp, used with the air, and in the intimacy of the mixture. In order to raise the air current in the gallery to a temperature similar to that of the atmosphere in colliery workings, the air supply was drawn through a system of heated pipes, so that, when passing at as high a velocity as 1000 feet per minute its temperature would be raised up to 80° or 85° F., even in the very severe weather during which some of these experiments were made.

The samples of coal dust experimented with were examined with respect to fineness, proportions of volatile matter and ash, and one or two other points, and they were all carefully dried before use.

Experiments were made in the first instance with a view of ascertaining the smallest proportion of fire-damp which, when mixed with the air passing through the apparatus, would furnish an atmosphere capable of firing at a naked flame of a particular size, placed in the gallery. It was next ascertained what quantity of gas below that proportion was needed to impart to the mixture of air with a large quantity of each particular coal dust the property of exploding throughout the gallery. By these experiments the samples were classed in the order of their sensitiveness to explosion, and it was found that those which were very rich in pure coal and which contained the highest proportion of very fine dust were the most sensitive, *i.e.* required the lowest proportions of fire-damp in air to bring them to explode readily when suspended in a dense cloud. But with the samples containing larger proportions of non-combustible matter the order of sensitiveness did not necessarily harmonize with the comparative richness of a sample in pure coal, nor with its comparative fineness, and this was strikingly illustrated by a sample of dust from one of the roads in Seaham Colliery, which contained more than half its weight of non-combustible matter, yet ranked only third in order of sensitiveness, while another sample, containing considerably more coal and a somewhat larger proportion of the finer dust, ranked fifth.

Another point clearly established, and confirming by more accurate data the observations of earlier experiments, was, that the proportion of fire-damp required in a mine to bring dust into operation as a readily exploding material when thickly suspended in the air is bordering upon and even below the smallest amount which can be detected in the atmosphere of a mine by the most practical observer with the use of the Davy lamp, the only means of searching for gas which has until quite recently been employed in mines. The highest proportion which can be thus detected by an experienced operator is stated to be about 2 per cent. Explosions were produced by dusts suspended in air travelling at a velocity of 600 feet per minute, when fire-damp was present in proportions ranging from 2 to 2·75 per cent.; in currents of low velocity the same result was produced with a sensitive dust in the presence of only 1·5 per cent. of fire-damp, and ignitions which approached explosions in their nature and extended to considerable distances were obtained with this dust in air containing still smaller proportions of gas. Mixtures of fire-damp and air bordering upon those which will ignite upon the approach of flame were found to be instantaneously fired by a lamp if they contain only a few particles of dust in suspension, and in connection with this fact the interesting observation was made that such dust particles need not be inflammable nor combustible to produce the result named. Mixtures of air and gas which passed a naked flame without any symptom of ignition were inflamed when particles of a fine light powder such as calcined magnesia were suspended in them. The action of certain of the pit dusts which contain comparatively little coal, in determining the ignition of mixtures of air and small proportions of fire-damp, is possibly of the same character as the behaviour of such a dust as calcined magnesia. The power of favouring the ignition of mixtures of fire-damp and air was not exhibited by some other powders similar in fineness to the latter, but differing in structure and density from this and one or two other non-combustible dusts which may be called active; even different samples of magnesia, differing somewhat in lightness from each other, appeared to possess the activity in different degrees. These facts seem to favour the view that a dust possessing particular physical characteristics exerts a contact- or catalytic action upon gas mixtures, similar to that known to be possessed by platinum and some other substances under particular conditions. Thus, when finely divided platinum, or even a clean recently heated surface of the compact metal, is brought into contact with mixtures of hydrogen, or of a hydrocarbon gas or vapour, with oxygen or air, oxidation of the hydrogen or hydrocarbon is at once established, accompanied by the development of heat, whereby the temperature of the metal is raised and chemical activity promoted, so that heat speedily accumulates, raising the metal to a temperature sufficiently high to bring the surrounding gas-mixture to the exploding point. If the metal presents a very large surface, or is in a specially porous condition, as in the form of sponge or very fine powder (*platinum black*), the explosion of the gas-mixture may follow very rapidly, or almost instantly, upon the first contact of some portion with it.*

In many of the experiments with calcined magnesia just referred to, it was distinctly noticed that a dark space intervened between the gas flame used as the source of heat and the flare produced by the ignition of the gas mixture through the influence of the dust cloud suspended in it, which would seem to indicate that the dust particles immediately upon passing through the flame established some amount of oxidation of the fire-damp, which proceeded with increased rapidity as the dust became more highly heated through the chemical action developed, so that within a short distance from the point where the heating commenced the dust became incandescent, and the ignition of the gas-mixture followed. Further experiments which are contemplated may elucidate the precise nature of this action of non-combustible dust in promoting the ignition of gas-mixtures which, in the absence of dust, are not inflammable; there appears little doubt, however, that it constitutes one element in the dangers arising from the presence of dust in the air of a mine which contains a small proportion of fire-damp, and in which a large body of flame is accidentally produced, either by a blown-out shot, or by a fire-damp explosion of local character.

Numerous experiments similar to those of Marreco and Morison were made by the lecturer at Wigan with mixtures of air and coal dust from Seaham and other collieries, in the complete absence of fire-damp, which were passed through the apparatus at different velocities up to 1000 feet per minute. Small cannon, specially constructed to ensure uniformity in the volume of flame produced at different times, were fired in them, either singly or in pairs in rapid succession; and exposed heaps of guncotton and of slow and quick burning gunpowder were exploded in the dust-laden air. The results occasionally confirmed to some extent those of Marreco and Morison and the Chesterfield experiments. At velocities of 400 feet per minute the dust, which was either passing at the time or was raised by the concussion of a first shot, did not appear to produce any increase in the volume of

* This action of platinum (or palladium) has recently received applications bearing special reference to the existence of explosive gas mixtures in coal mines. The one consists in an apparatus proposed by Mr. Körner for removing, by slow combustion, local accumulations of fire-damp; the other is a very simple and portable photometric apparatus devised by Mr. G. H. Liveing, by which proportions of fire-damp much lower than the smallest amount discoverable by the Davy lamp in the hands of the most expert, can be readily and quickly detected, and the amount estimated with considerable accuracy.

flame furnished by the cannon, but a decided though inconsiderable lengthening of the flame was several times observed at higher velocities and with the employment of the most inflammable dusts. Some of these, when thickly suspended in air travelling at velocities of 500 to 1000 feet per minute, and exposed to the action of a large flash of flame (as produced by the loose heaps of guncotton and *blasting* powder) exhibited a tendency not only to burn explosively in and close around the flame but also to propagate flame, or cause it to travel along some distance; but the most decisive results of these experiments were not of a nature to warrant the conclusion that flame could be carried along indefinitely, or even to a very considerable distance, by coal dust in the complete absence of fire-damp, as now maintained by Mr. Galloway. There can be no question that the scale of magnitude upon which the first ignition in the dust-laden atmosphere is produced must greatly influence the extent to which the propagation of flame in this way will extend, and Mr. Galloway's experiments at Llwynpia, therefore, were likely to develope conditions more nearly approaching those of the real state of things in a mine than experiments in galleries of smaller dimensions, and with small initiating volumes of flame. But the necessity for caution in deducing very decided conclusions from even large-scale experiments appears to be illustrated by some of Mr. Galloway's results, inasmuch as some of the great distances to which the flame extended were observed under conditions decidedly favourable to the projection of the flame by causes which would not come into play in the same way in a mine-working. The experiments made some years ago by Mr. Hall in an adit (which have already been referred to) appear to have a more direct bearing upon results likely to be actually produced underground in a dust-laden atmosphere. In those experiments the extreme distance to which flame was carried by dust first ignited by the flame from a very excessive charge of powder (4 lb.) was 180 feet. It is of course possible that the coal used was not of the most inflammable description, and that its fineness and density were not most favourable to its becoming very thickly suspended in air. On the other hand, Mr. Hall stated, in his evidence before the Royal Commission, that the atmosphere in the adit was only "practically" free from gas.

The volume of flame from a blown-out shot in a mine-working is generally considerable, but it appears that exaggerated estimates are entertained of the distance to which, *in the absence of dust*, the flame will be projected, and it is probable that the large volumes of flame, extending occasionally to many yards from the spot where the shot was fired, are in a great measure due to the ignition of dust raised by the concussion and rush of air at the instant of firing. Mr. Hall, in his experiments in the adit, found that the flame from the shot of 4 lb. of powder reached to a distance of only 18 to 21 feet when no dust was present. A few months ago that official directed the attention of the lecturer to the occurrence of two accidents in the Liverpool district, each one occasioned by a shot of 1 lb. of powder blowing out its stemming without shaking or bringing down any coal. In both instances the shot lighter and two pitmen had retired about 100 feet from the seat of the shot, that is, about 30 feet in a straight line with it, and 60 to 80 feet along both directions of a working running at right angles to the drift in the face of which the charge was fired. In the case of one accident a man was killed, and serious injuries were sustained by the other men in both instances. There were signs of charring upon the props up to, and 5 or 6 feet beyond, where the men were standing, but they did not extend farther. The drift and the level in which these accidents occurred were 5 feet high and 12 feet wide. Mr. Hall informed the lecturer that a strong impression existed among mining men on the spot that the flame of the shot, quite unaided by gas or coal dust (the latter was known to be present), would have extended so as to produce the effects described. This appeared so at variance with Mr. Hall's experiments in an underground working, and with Mr. Abel's own experience in other directions, that the latter has endeavoured to obtain some precise experimental data with regard to the distance to which any burning effect from a blown-out charge of 1 lb. or 1½ lb. of powder would extend in a mine working, in the absence of dust. With this object he availed himself of the friendly assistance of Major Durford, R.E., Instructor in Field Fortifications at the School of Military Engineering, Chatham, under whose direction Lieutenant Raban has carried out an instructive series of experiments in accordance with suggestions made by Mr. Abel as the work proceeded.

(*To be continued.*)

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Hyde Petty Sessions, on Monday, June 19, before Messrs. John Wood (Chairman), and W. Sidebottom, Owen Stafford, of 51, Market Street, Hyde, was summoned by the Chemists and Druggists' Trade Association for selling a certain poison, to wit laudanum, the same being a preparation of opium, and not labelling the article properly.

Mr. Henry Glaisyer, Solicitor to the Association, appeared for the prosecution; Mr. T. Drinkwater appeared for the defence, and said he should plead guilty to the offence.

Mr. Glaisyer said Mr. Templeman was the Assistant-Secretary to the Chemists and Druggists' Trade Protection Association, whose head office was at Birmingham, and the prosecution was brought under the provisions of the Pharmacy Act of 1868, which required that certain formalities should accompany and precede the sale of poisons. They would be found in the 17th section of the Pharmacy Act of 1868. Defendant was not a registered chemist and druggist, and had no right to deal in poisons at all.

The Chairman supposed it was a question as to whether defendant was or was not a qualified man.

Mr. Glaisyer said it was more a question of using labels, so that there might be no mistake when the poisons came to be used. The 17th section of the Pharmacy Act provided that no person should undertake the sale of poisons by wholesale or retail unless the boxes or covers were distinctly labelled with the name of the article, and the word "poison," supplemented by the name of the particular poison sold. The poison in question was a preparation of opium, and was dealt with in the second part of the schedule. In this case, on the label in question appeared the word "poison," and the name of Mr. Stafford as the seller, but the name of the article did not appear, and the Bench would see that that was a very serious offence, because if the nature of the poison was not known, and supposing several bottles were standing together, a person would not know which to take.

The Chairman said he should think the word "poison" was sufficiently distinctive. Supposing the Latin word for the poison appeared on the label, how could that afford any security?

Mr. Glaisyer said a person might have several bottles labelled with the word "poison," and being ignorant of the specific contents of each bottle might very easily select the wrong one if laudanum was wanted. Laudanum was sufficiently well known in English, and was often used for the toothache.

The Chairman mentioned that there were vegetable poisons.

Mr. Glaisyer said if the bottles were properly labelled a person would know which of the bottles he had to take. On the 12th inst. Mr. Templeman visited Hyde, and proceeded to the shop occupied by Mr. Stafford. Amongst other things he purchased was a bottle of laudanum pro-

duced. The label on the bottle was marked "Poison, Owen Stafford, formerly with T. Standring and Son, Manchester, Medical Hall, 51, Market Street, Hyde." 9½*d.* was paid for the bottle. Mr. Templeman subsequently analysed the laudanum supplied, and had found it to be a preparation of opium, as he expected. All preparations of opium and poppies were poisons in the meaning of the Act.

The Chairman: You say it should be described as laudanum?

Mr. Glaisyer: Yes.

Mr. Sidebottom: Is Mr. Templeman one of the agents of the Association?

Mr. Glaisyer: He is the Assistant-Secretary.

The Chairman: He goes about to see that the articles sold are genuine?

Mr. Glaisyer: Yes, and for the protection of chemists and druggists generally.

Mr. Drinkwater said he was not going to dispute the facts, as the Act plainly stated that the word "laudanum" should have appeared on the paper. He wished, however, to state the circumstances under which the sale took place. Mr. Templeman went into his client's shop and asked for a 6*d.* feeding bottle, then for some linseed meal, and afterwards for 2*d.* of laudanum to mix with it, as he wanted to make a poultice for his wife. Defendant asked Mr. Templeman what quantity of ingredients should be put together, and knowing it was to be made into a poultice he did not take the same care he would have done in an ordinary individual, but to someone like Mr. Templeman, who appeared to have some faculties about him, the word poison would be sufficiently distinctive.

The Chairman said the Act was intended to apply to the general public. Mr. Templeman no doubt knew what the word poison meant, but caution must be used to protect the general public.

Mr. Drinkwater said that in the case of a gentleman like Mr. Templeman no harm could be done. Defendant was a very respectable gentleman, and held certificates from gentlemen in London that he had a good knowledge of his profession, therefore he submitted that as the word laudanum had merely been omitted from the label it was not a serious offence, and he thought the ends of justice would be met if the Bench imposed the smallest fine it was in their power to inflict. Mr. Stafford would take care that he should not again be wanting in due caution.

The Chairman said they were quite satisfied that the requirements of the Act had not been complied with. Because there might have been no fear that evil consequences would ensue in this case, yet if the public saw that the Bench were inclined to treat the present offence with laxity serious consequences might ensue from the future sale of poisons, and the Bench would be blamed. It was not a case calling for a heavy penalty, and as it seemed to have been an act of carelessness on the part of Mr. Stafford rather than with an intention to infringe the law, he would be fined 10*s.* and costs.

Mr. Glaisyer asked if any extra costs would by allowed.

The Chairman said they thought it was a prosecution which could not have been conducted without the aid of an advocate, and therefore they should allow one guinea for the advocate's fee in addition to the other costs.—*North Cheshire Herald.*

Adulterated Sweet Spirit of Nitre.

At the same court, Joseph Green, grocer, Hyde, was summoned for having sold to Sergeant Harrison, on May 24, a quantity of sweet spirit of nitre which was not of the nature, quality and substance demanded.

Defendant pleaded not guilty.

Sergeant Harrison stated that on May 24, he called at defendant's shop in Hyde Lane, Hyde. Defendant's wife was in charge of the shop, and he asked her for 2 oz. of sweet spirit of nitre. She supplied it, and witness paid her 6*d.* He afterwards told her he was buying it for the purpose of being analysed by the county analyst, Mr. Carter Bell, and offered to divide it into three parts, but she said it did not matter, she sold it the same as she got it from a firm in Ashton. Constable Ashford sealed the bottle, and witness put on a label in her presence to distinguish the bottle. The following day he delivered it to Mr. Bell. After he had paid her for the sweet nitre she drew his attention to a small label at the bottom of the bottle, which stated that the sweet nitre was not pure and would not stand the test.

Defendant produced a bottle containing sweet nitre, and asked witness if he could not see the label upon it through the shop window.

The sergeant said it was not the same bottle, but a much smaller one than that from which he was supplied, and the label was nothing near as large.

Defendant said he had no other bottle in the shop, and he was not aware that there was any other quality of sweet nitre.

Constable Ashford corroborated Sergeant Harrison.

Captain Lingard produced the analyst's certificate, which stated that the sample submitted to him was adulterated with 25 per cent. of water.

A fine of 10*s.* and costs or seven days was imposed.

James Buckley pleaded guilty to a similar offence.

Sergeant Harrison stated that on May 18, he called at defendant's shop at Micklehurst, and purchased 4 oz. of sweet spirit of nitre, for which he paid 1*s.* Defendant and his wife were present, and the defendant sold the article as they got it.

The sweet spirit of nitre, according to the analyst's certificate produced by Captain Lingard, was adulterated with the same percentage of water as in the last case.

Defendant, in reply to Captain Lingard, said he purchased the sweet nitre from Bickell's, of Ashton.

The Chairman said it was an extraordinary thing tradesmen did not protect themselves when they knew the regulations of the Act of Parliament, and defendant would be fined 10*s.* and costs.

Paregoric without Opium.

At the same court, Thomas Farrand, of Tintwistle, pleaded guilty to having sold to Sergeant Harrison a quantity of paregoric which was not of the nature, quality and substance demanded.

Sergeant Harrison stated that on May 18, he called at defendant's shop at Micklehurst, and purchased from his wife 2 oz. of paregoric, for which he paid 6*d.* He also bought 2 oz. of mustard, but that had been returned pure.

The analyst's certificate stated that the sample was adulterated with 17 per cent. of water, and it did not contain opium, which was one of the ingredients of paregoric, therefore it came under the 9th section of the Act.

Defendant said he bought it and sold it as pure paregoric.

The Chairman: Have you a written warranty from the seller?

Defendant: They will not give us a warranty.

The Chairman: Then you must take the consequences.

Defendant said he bought the paregoric from Bostock's, of Ashton.

Fined 10*s.* and costs or seven days.—*North Cheshire Herald.*

Reviews.

A Treatise on Chemistry. By H. E. Roscoe, F.R.S., and C. Schorlemmer, F.R.S. Volume III. The Chemistry of the Hydrocarbons and their Derivatives, or Organic Chemistry. Part I. London: Macmillan and Co.

This is a continuation of the treatise on chemistry upon which Professors Roscoe and Schorlemmer are engaged, which they have previously carried to the end of the metallic elements.

The volume before us commences with an historical

introduction, giving an account of the gradual development of our knowledge of the carbon compounds up to 1844, when Gerhardt introduced the terms homologous and heterologous series. Then follows a description of the various methods of organic analysis, commencing with that employed by Lavoisier, in 1781, and ending with those at present in use. This section closes with a very complete account of the methods of determining vapour densities, which includes a full description of those recently introduced by Victor and Carl Meyer. These practical matters are followed by an explanation of the methods by which molecular formulæ are ascertained, and by a notice of the phenomena known as isomerism, metamerism, polymerism. The system upon which carbon compounds are classified is next entered upon, and then the authors pass to the consideration of the members of the chief groups. In this, as in the earlier part of the book, the treatment adopted is historical, systematic, and at the same time in the case of the more important substances, eminently practical, full details of the modes of production being given in these cases. The system of classification which Professors Roscoe and Schorlemmer have adopted is not unfamiliar. Commencing with the paraffins, methane and its derivatives are first studied, then ethane and its derivatives and so on. Thus methane, methyl alcohol, and the oxide, chloride, and cyanide of methyl are considered together with formic aldehyde and formic acid; an arrangement which has the advantage of impressing the relations of these bodies on the mind of the reader with great distinctness. The general nature of classes of compounds, such as the alcohols, acids, amines, etc., is to some extent discussed before the detailed study of the hydrocarbons and their derivatives is commenced.

From the foregoing sketch it will be seen that in this work the subject is treated in a somewhat different manner to that which has of late been most frequently adopted by writers on organic chemistry in this country. In the first place, there is generally more detailed information about important commercial operations, and rather a fuller account of analytical methods. In the second place, each substance is here considered in connection with a group of dissimilar bodies, all of which may be regarded as derived from the same hydrocarbon by substitution, instead of being taken with a group of similar bodies. Thus formic and acetic acids instead of being grouped together with the other fatty acids are apart, being placed with the methane and ethane groups respectively. As it is highly desirable that neither of these points of view should be lost sight of, this latter feature in Professors Roscoe and Schorlemmer's work is all the more welcome.

In the sections on organic analysis the student will find almost all that is necessary to enable him to attack work of this kind, and attention is drawn (p. 58) to the importance of certain precautions in employing the modern breechloading process for determining carbon and hydrogen. Our own experience with this process seems to show that very often the inaccurate results obtained are due to the employment of too greatly reduced pressure, which seems to result in air, highly charged with moisture and carbon dioxide from the neighbouring furnace, diffusing through the india-rubber connection between the drying tube and that employed for absorbing the carbon dioxide. This can be avoided by using a very short connection; but a more satisfactory plan is to so arrange the flow of water from the aspirator that the pressure inside the tubes is only just below that of the air. We are sorry not to see any mention of the method lately introduced by Mr. Perkin of absorbing nitrous fumes by means of a mixture of chromate of potassium and manganese dioxide heated to about 230° C. This plan requires a little care, it is true, but if properly carried out it offers considerable advantages.

The portions of the work which treat of such bodies as alcohol, ether, acetic acid, and methyl chloride, generally include a considerable body of information as to the manufacturers' modes of preparing them, and with the very complete account of the various methods which have been used for rectifying alcohol, and for determining the strength of solutions of it, would be specially valuable to our readers.

The part of organic chemistry included in so much of the work as is in our hands at present does not extend beyond the paraffins and their derivatives, and certain bodies allied to them, and it closes with an account of the chemistry of soap. This division of the subject is so comparatively well known that there is not so much room for controversy as in many others.

The numerous references to original papers which occur throughout the book and the historical details with which it abounds from beginning to end are features which add enormously to its value and to the interest with which it will be read. Here and there, however, there are blemishes due to imperfect revision, as, for instance, in the description of the preparation of zinc-methyl (p. 247), where it is stated that upon methyl chloride being added to zinc sulphate crystalline zinc-methyl iodide is formed. Nevertheless, we can strongly recommend the work to students of this branch of science who would know their subject in all its aspects, and to more than an elementary extent. Probably there never was a more thoroughly readable book on chemistry written.

On the Treatment of Cancer. By John Clay. London: J. and A. Churchill. 1882.

This pamphlet, although written principally for the medical practitioner, contains an unusually large proportion of matter that is of interest to the pharmacist. Rather more than two years have elapsed since the publication in the *Lancet* of a communication from Professor Clay upon the treatment of cancer with Chian turpentine directed considerable attention to that nearly obsolete drug. Such pharmacists or wholesale druggists as were fortunate enough to have any quantity of the drug then among their old stock were able to dispose of it profitably; those who had not were compelled to look about for a supply, and speculative calculations were even made as to whether the next year's production in the island of Scio would be equal to what would be required. No doubt the demand suddenly created for a comparatively unknown drug brought some spurious articles into the market, and Professor Clay has shown great readiness to attribute the non-success following the treatment that has been reported by different practitioners to the substitution of other substances for Chian turpentine by the dispenser. It may be useful to remark, therefore, that Professor Clay adopts the "excellent description" of the drug given in the 'Pharmacographia' as a means of diagnosing the genuine article. He also speaks of an unstrained or rough kind of Chian turpentine that he has received direct from Scio, which although "the most genuine form of the drug, as it has not been subjected to any artificial method of purification," presents external characters so different to those of the strained gum that it might be condemned by the uninitiated as impure. The passage is worth quoting:—

"The Pistacia terebinthus tree, from which the gum is procured, is a very hardy one, it lives to a great age, and in the island of Scio attains the size of an American elm—between 30 and 40 feet high. In June or July an incision is made into the bark, through which the gum flows and runs down the tree and soon solidifies on exposure to the atmosphere. The sticky nature of the gum causes various matters, such as sand, the fruit of the tree, straw, leaves, etc., to adhere to it. When the gum has ceased to ooze from the incision, it is scraped off the tree with a large dull knife, and this process necessarily brings off portions of the bark, thus constituting an additional impurity. When the rough turpentine is strained, the minute particles of the foreign substances above mentioned cannot be

separated from it and form the impurities found in all strained Chian turpentine. The rough Chian turpentine after it has been exposed to the atmosphere is found on importation to be a rough dry substance, of a light brown colour, covered with a dirty white powder, and it appears to be one mass of seeds, bark, sand, etc. On taking a small piece of the mass and rubbing it for a few minutes between the thumb and finger the characteristic odour of the gum is at once strongly perceived. It is almost tasteless; the turpentine is readily dissolved out of the rough mass by ether, or it may be melted and strained. This rough turpentine is admirably suited for making an emulsion, as the whole of the properties of the gum are extracted by the ether without waste, and would probably add to its efficiency. Mr. Whinfield, the dispenser to the Queen's Hospital, informs me that from 3 pounds of the rough turpentine he obtained 1 pound and 11 ounces of the real gum, of excellent quality, the rest being impurities."

Professor Clay has also received a greyish-white variety, having an appearance similar to that of glazier's putty, which gives off the characteristic odour when rubbed between the thumb and fingers and is tasteless; it is said to be used by the natives for chewing, but he has not tried it in medicine.

Notwithstanding unfavourable opinions that have been expressed Professor Clay says there is now no doubt that Chian turpentine administered internally does prove very beneficial in most forms and situations of cancer, especially if it be used early. He still adheres to the form of pill containing 3 grains of turpentine and 2 of sulphur, with a caution against the use of magnesia as an excipient. The original form of emulsion, difficulty in dispensing which gave rise to some correspondence in this Journal, has been abandoned; the sulphur has been left out, being administered separately in a pill, and the powdered gum tragacanth is rubbed up with rectified spirit, as first suggested, we believe, by Mr. J. S. Palmer (*Pharm. Journ.*, [3], x., 1011). The following are the author's present directions:—

"It is necessary in the first place to provide an ethereal solution of Chian turpentine. This is made by dissolving ½ ounce of Chian turpentine in 1 ounce of pure ether, sp. gr. 720. Then take 1 drachm of powdered gum tragacanth and 1 drachm of rectified spirits of wine, rub together and add water gradually to make a mucilage up to 9 ounces; then add the solution of Chian turpentine to the mucilage in a bottle, and shake until the whole is properly mixed. A more elegant but more expensive essence is made by using powdered gum arabic instead of the powdered gum tragacanth. To make a 10-ounce mixture, take 1½ ounce of powdered gum arabic, and water to 9 ounces to make a mucilage. Then put this into a bottle and add the solution of Chian turpentine, and agitate until the whole is well mixed. One teaspoonful of the essence is equal to one Chian turpentine pill, the dose is therefore two or three teaspoonfuls three times a day."

It may be useful to mention that in some cases, in addition to the internal treatment, Professor Clay dusts the parts affected with a powder made in the following proportions:—Tannic acid, ½ ounce; powdered charcoal, 2 drachms; and powdered sulphate of copper, 10 grains.

Hot Water Heating on the Low Pressure System. By F. A. Fawkes, F.R.H.S. London: B. T. Batsford. 1882.

The author of this handy little book has been engaged for some years as a hot-water engineer, and for the convenience of inquirers has brought together some useful information upon the principles involved and the apparatus used in the heating of buildings by hot water. A brief but clear description, illustrated by diagrams, of the low pressure system, forms the principal portion of the book. Other systems of heating are also briefly alluded to, and there is also a list of the possible causes of failure. Advertisements are present in unusual force for so small a book, but their introduction may be excused on the ground that they will be useful to any person intending to carry the teaching of the text into practice without further consulting the author.

Notes and Queries.

[729]. I have not experienced the slightest difficulty in preparing this tincture. To the quinine in a bottle add the proof spirit, shake well, then add the liq. ammonia (either gradually or all at once, it makes no difference), and a perfect solution is instantly obtained. *No heat is required.* Quinine will dissolve in the mixed proof spirit and liq. ammonia, but this takes a little longer to prepare. The former process is the one I always adopt.

Leamington. Samuel A. Smith.

[731]. I think, with your querist "Specific Gravity," that Squire is slightly in error with the "colour description" of syr. ferri iodidi, and that "*nearly* colourless" would have been more accurate.

By using a pure sugar, exposing the solution of iodide to the air as short a time as possible, and filtering with the funnel dipping into the syrup, previously prepared, I obtain a syrup, the colour of which is scarcely perceptible in a filled 2-oz. white glass phial. After passing through the filter the solution should be of a beautiful sea-green tint.

Squire says, "it keeps colourless in well-filled bottles." It may not colour so rapidly in "well-filled bottles," but from actual experiment I find, that with a single air bell, decomposition takes place, which is indicated by the syrup nearest the contained air becoming of a decided straw colour in the course of four or five days.

Edinburgh. John.

Correspondence.

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

E. L. Riddell.—To be able to answer your question it is necessary in the first place to know what is the composition of the ink.

A Co-Executor.—There is no exemption in the Pharmacy Act under cover of which even the executors of a deceased medical practitioner can legally carry on the business of a chemist and druggist with or without the aid of a qualified man. In the case, therefore, that you put, where the executors of the deceased widow of a medical practitioner carry on such a business, there can be no doubt that they are breaking the law.

Pilocarpine.—"Cascara sagrada" is the name under which the bark of the Californian *Rhamnus Purshiana* has been introduced to the medical profession in the United States as a remedy in cases of obstinate constipation. The plant is closely allied to *Rhamnus Frangula*, and probably resembles it in its therapeutic value.

"*Cæsariensis.*"—Johnston's 'Elements of Agricultural Chemistry and Geology' (Blackwood, 1871).

A. H. H.—Either Ganot's or Deschanel's work would answer the purpose equally well.

H. Peet.—To a great extent it is a matter of individual discretion as to what coating is put upon pills, for prescriptions seldom give any instructions upon the point.

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J. H., A.P.S. (who should have sent his name and address) is recommended to address his question to the Registrar.

Communications, Letters, etc., have been received from Messrs. Hayden, Smith, Philos Lex, H. C. H.

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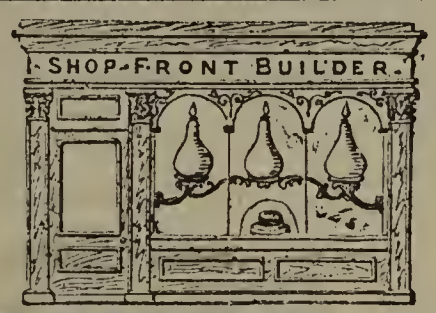

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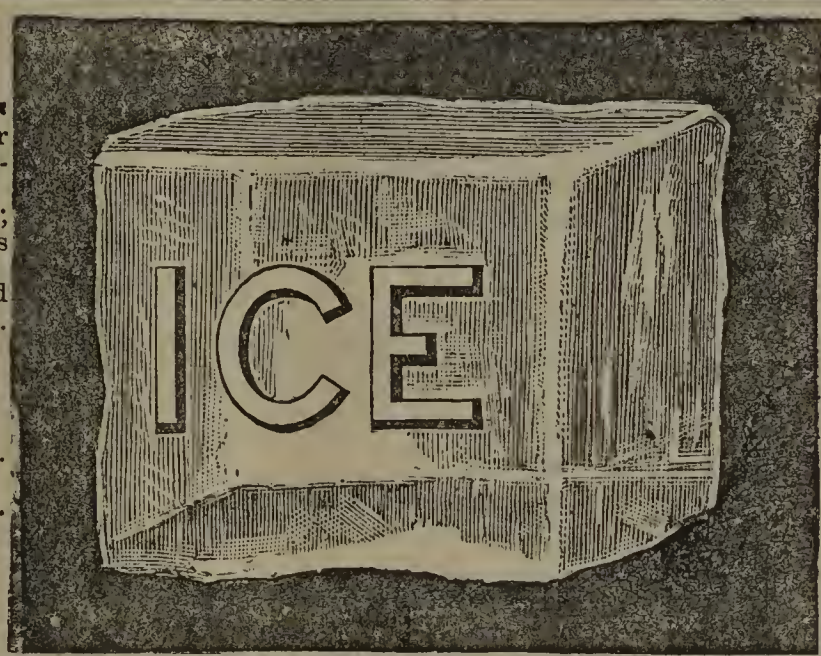

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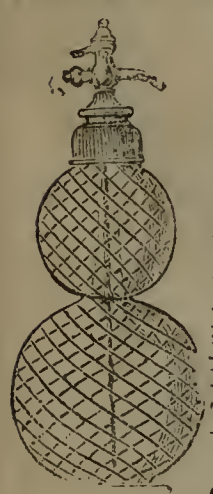

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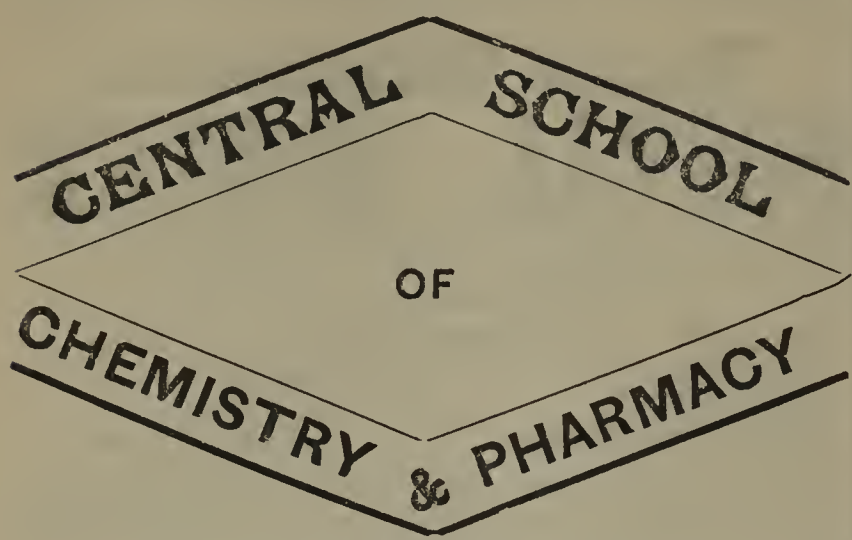

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The last course of the present session has now commenced, which will terminate at the July examinations.

The fifth session of this School will open on September 1st, entries for which should be made to

Messrs. LUFF & WOODLAND.

MINOR & PRELIMINARY.

TULLY'S Postal System is the most successful method of preparing without leaving business. Fee—MINOR, One Guinea. PRELIMINARY, 10s. 6d. Send stamped envelope for particulars and *original Testimonials* (*not Copies*) to Mr. J. TULLY (Hills Prizeman), Chemist, Tunbridge Wells. Established 1872.

THE

EASTERN COUNTIES SCHOOL

Of Chemistry and Pharmacy,

GRIMSBY.

Mr. W. S. TURNER desires to be known as a thorough and successful teacher, and he grounds his claim to be so "recognized" upon his *repeated* success both at London and at Edinburgh.

Fee for instruction,

MINOR or MAJOR, £3 3s. per Month.

PRIVATE TUTOR.

Mr. JAS. W. SAUNDERS, A.P.S., G.S.T., &c.

130, CAMDEN ROAD, N.W. (note change of residence).

TWO out of **FOUR** of my Students passed at the JUNE MINOR. Special teaching (private or postal) for JULY candidates. At home for interview daily from 1 to 2.30. Laboratory close to Gower Street Station.

THE WESTMINSTER COLLEGE

The next Session will commence on

Friday, September 1st, with an Introductory Address by Mr. GEORGE WILLS, Principal. After which the Prizes will be distributed.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

Since the opening of the present Session (September 1st) the Editors of several of the leading Journals, and representatives of the press, have visited the Westminster College, and pronounce it to be the most complete establishment of its kind in England.

The soundness and thoroughness of the education is demonstrated by the fact that nearly half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College.

The subjoined Pass-list for this month speaks for itself, and is a more reliable guide than flattering Advertisements, in enabling Students to decide at which School they can prosecute their studies with the greatest success. Columns might be written upon the numerous advantages offered by this College, but we prefer to rely upon results.

LONDON MINOR EXAMINATION.

JUNE, 1882.

41 Candidates were examined. **24** Failed. **17** Passed.

FROM THE

WESTMINSTER COLLEGE.

14 presented themselves, the following **9** passed.

ARKLE, C. A.	Lancaster
COOMBS, W. T.	Brentford
ELTON, T. F.	Cirencester
HILL, A.	Leicester
COATES, U. A.	Walsall
HUMPHRIES, J.	Cleckheaton
RICKETTS, J.	Plymouth
SPENCER, G.	Hitchin
THOMPSON, C. L.	London

FROM ALL OTHER

SOURCES COMBINED.

27 presented themselves, the following **8** passed.

BIRD, F. C. I.	Bath
DANGERFIELD, W. H.	Devizes
DARCH, A.	Islington.
HALL, J. T.	Manchester
LOWTHER, T. W.	Cardigan
MILLS, A. E.	Herne Hill
WILKINS, E.	Reading
WILLCOCKS, A. S.	Portsea

Mr. W. TWISS was also successful in passing the Modified Examination from this College.

Gentlemen who have previously failed, or are advanced in their studies, can attend the present Course of Lectures for the July Examination. Fee £2 2 0.

For revised prospectus and further particulars, apply to

E. WALDEN, Secretary.

TRINITY SQUARE, LONDON, S.E.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

AS ASSISTANT. Temporary or permanent. Age 28. Can Prescribe, Extract Teeth, &c. Moderate salary. Good references. AQUA, 112, Duke St., Chorlton Rd., Manchester.

AS MANAGER or out-door ASSISTANT. At once. Age 30. Used to first-class trade. Held last appointment 10 years. Trebled returns third year. Well known to all the Wholesale and Retail houses. State salary and all particulars, F. H. S., 82, Seven Sisters Rd., Holloway, N.

AS JUNIOR in Retail and Dispensing business. 4½ years' experience. Age 21½. Full particulars to C. J. B., 11, Queen's Sq., Wolverhampton.

AS ASSISTANT. In London. Town and country experience. Age 23. Good references. A. B., 6, Prospect Pl., Bow St., Scarboro'.

AS JUNIOR. In or out-door. 5 years' good experience. Age 20. Height 5ft. 10in. For references, &c., W. E. P., Pallance, West Cowes, I. of W.

TEMPORARY.—A gentleman, qualified, of experience in town and country trade, seeks an ENGAGEMENT to take charge during absence, &c. Highest references. PHARMACIE, 2, Chichester St., Maida Vale, W.

IN London. As JUNIOR. Where 2 are kept. First-class experience. Good references. CHEMICUS, 24, Lewis St., Aberdare, S. Wales.

BY a Medical ASSISTANT, with a Chemist, who would give time to read for the Pharmaceutical. Advertiser has had over 14 years' experience in Dispensing and Retail. Excellent testimonials. SIGMA, 413, Kingsland Rd., N.

AS out-door ASSISTANT or MANAGER. Married. Age 30. Speaks French. ASSISTANT, 14A, Brewer St., Golden Sq.

AS ASSISTANT. Permanent or temporary. 20 years' experience. Good references. G. B. M., 246, St. Paul's Rd., Highbury, N.

TEMPORARY. Ætat. 30. By day, week or month. Thoroughly experienced in all branches of the trade. Irreproachable references. Terms very moderate. Disengaged. A. WOOD, 2, Woodfield Cres., W.

ADVERTISER desires ENGAGEMENT in Dispensing house. Town preferred. In or out-door. Accustomed to first-class business. Good address. Excellent reference. F. W., 134, Lisson Grove, N.W.

TO Principals.—Dispensers, in or out-door, Locum Tenens, Managers, Seniors, Juniors, Half-Timers requiring time for study or attendance at lectures, Improvers, Apprentices, can always be supplied by Mr. HENRY JUDD, Pharmaceutical Agency, 29, Gt. Coram St., W.C.

AS ASSISTANT, Wholesale or Retail, or MANAGER of Branch. Out-door. 8 years' good experience. Age 25. Can Extract Teeth. A. B., T. Wheeldon, Chemist, Upper Jackson St., Hulme, Manchester.

ENGAGEMENTS WANTED.

AS JUNIOR in a good house, where 2 or more assistants are kept. Age 21. 5 years' experience. Can be well recommended. Particulars to J. H. STANFORD, Chemist, Stamford.

MANAGER of Branch, or out-door, by Registered Chemist. Married. Accustomed to Postal duties. 11 years in present situation. E. R., 11, Gloucester Rd., Birkdale, Southport.

EARLY in August.—As IMPROVER in a good Retail or as DISPENSER to Surgeon. Ætat. 19. Good references. Small salary. Can Prescribe. B., Jones, Chemist, South Stockton.

IMMEDIATELY.—In-door. With Surgeon or Retail. Can Prescribe, Extract Teeth, quick and accurate Dispenser. Unexceptional references from two last situations. PRESCRIBER, 10, Shrewsbury Rd., St. Stephen's Sq., Bayswater.

AS ASSISTANT or DISPENSER for a few hours during the day, by one preparing for the Minor. Experience 7 years. Age 21. Personal interview preferred. J. H., 519, Caledonian Rd., N.

AS JUNIOR. 8 years' experience. Age 21. Has knowledge of Post Office duties and Telegraphy. Disengaged third week in July. CHEMICUS, Mr. Swonnell, 2, Dix's Fields, Exeter.

JUNIOR, in good house, with opportunity of improvement. Ætat. 18. Height 5ft. 9in. Passed Prelim. Knowledge of German. G. H. ALLOTT, Monson St., Lincoln.

LOCUM TENENS or TEMPORARY. A Major Student, disengaged for the next 6 weeks, is prepared to undertake above. North Wales preferred. T. J. R., 7, Market Pl., Ruthin.

TO take the MANAGEMENT of a country business. Registered. Age 39. Married. 23 years' experience. Salary 30s. per week, with apartments. A. Z., Mr. H. POWELL, Chemist, Stanstead Rd., Forest Hill, S.E.

IN a Dispensing business. Until the end of August. London preferred. Apothecaries' Hall. Age 22. Good references. H. WHIFFIN, Bedford.

AS JUNIOR or IMPROVER. Age 19½. Height 5ft. 6in. Good reference. London preferred. Where 1 or 2 kept. T. W., 37, Georgana St., Camden Town, London.

AS JUNIOR. In London. Age 21. 6 years' experience in Dispensing and Retail. Satisfactory references. D. J. E., Barron, Squire & Co., Bush Lane, Cannon St., E.C.

OUT-DOOR ASSISTANT or MANAGER of Branch. 6½ years in last engagement. Good testimonials. Town or suburbs. I., 10, Coln Villas, Mill Hill Rd., Acton.

AN Italian Chemist, aged 30, desires a situation in a good pharmacy as ASSISTANT. Good reference. Salary no object. MAGLIO, 7, Hadyne Park Villas, Percy Rd., Shepherd's Bush.

LOCUM TENENS for a short time. An experienced Chemist. Disengaged. Middle aged. Good-class business only. Letter or telegram to W. L. G., City News Rooms, St. Bride St.

OUT-DOOR, or temporarily in-. Successful Prescriber. Expert Tooth Extractor. Experienced in good-class Dispensing, Mixed country, Hospital and Private practice. J. FOULKES, Silsden Leed (no Sunday delivery).

AS MANAGER (branch or otherwise), with view to purchase. Registered. Age 30. Married. Thorough practical experience in first-class business. C. M., 180, Graham Rd., Dalston.

AS JUNIOR in a Retail and Dispensing business. 6 years' experience. Age 20. W. C. L., Tomlinson & Crowder, Barton-on-Humber.

ASSISTANTS WANTED.

DUTTON & SON, Birkenhead, require immediately a competent in-door ASSISTANT, able to take charge of a good Dispensary business if required. State salary, reference, &c.

A JUNIOR ASSISTANT, for light Drug business. One acquainted with Dentistry preferred. Apply, T. C. TURTON, Chemist and Dentist, Howden.

APPRENTICE. Immediately. In a first-class Retail and Dispensing business, in the West-end, a well educated Youth as an APPRENTICE. 5 others employed. A good premium required. A. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

AN ASSISTANT. Well up in Retail and Counter Prescribing. Not under 21 years of age. One with Minor qualification preferred. Reference as to sobriety indispensable. Salary £40 (in-doors), and commission. Apply, BELL & Co., 100, Commercial Rd., E., before 11 a.m. or after 6 p.m.

A YOUNG MAN. 20 or 21 years of age. One used to a good-class Mixed country business. Must be an accurate Dispenser and able to produce unexceptionable references as to character. One other assistant kept. Apply to THOMAS DIXON, Chemist, Rickmansworth, Herts.

YOUNG MAN, for Wholesale house in Scotland. One with experience in Laboratory preferred. Apply, stating age, salary expected, &c., to ALPHA, Meggeson & Co., 14, Miles Lane, London, E.C.

IMMEDIATELY.—In-doors. An ASSISTANT. About 22 years of age. Of steady habits. In a light Retail and Dispensing business. Apply, stating terms, &c., to P. I., Pharmaceutical Chemist, Bury St. Edmunds.

A COMPETENT, trustworthy ASSISTANT (out-door), of good address, age about 24, for a Mixed country business. A good Prescriber and able to Extract Teeth. Good references indispensable. Apply, stating age, height, salary, enclosing carte (to be returned), to FRANCIS CLATER, Pharmaceutical Chemist, The Square, Retford.

DISPENSER. An ASSISTANT, on or before 26th of July, to take entire charge of Dispensing room. Must be thoroughly competent and quick at his work. Character must be equal to strictest investigation. Salary, out-doors, to commence at £90. Apply, enclosing carte, with all usual particulars, to STEPHEN WAND, 18, Haymarket, Leicester.

AN ASSISTANT, experienced in Dispensing and light Retail. Only 1 kept. Salary £50. In-door. Apply, R. HISCOCK, Chemist, Coventry.

AN ASSISTANT, for a light Retail and Dispensing business. Apply, stating usual particulars and when disengaged, to H. JEFFERY, Chemist, Bristol.

A JUNIOR ASSISTANT, who has been accustomed to good Dispensing business. Age about 20. Full particulars to FROST & COPE, Pharm. Chemists, Derby.

SOUTH Africa.—A qualified ASSISTANT, for Dispensing and Retail business at Kimberley. Also a qualified ASSISTANT, with a thorough knowledge of Homœopathy. 3 years' engagements in both cases. Salary, £120 the first year, £150 the second year, and £180 the third year, with commission. Lodging provided. First-class passage and coach fare paid. Address, B. G. & Co., 27, Wool Exchange, Basinghall St., London, E.C.

IMMEDIATELY.—A competent ASSISTANT for the dry counter. Apply to Messrs. BARRON, HARVEY & Co., Giltspur St., E.C.

A JUNIOR ASSISTANT, in a light Retail and Dispensing business. Must be an accurate Dispenser. Good references required. Apply to H. GOODALL, Derby, stating age, height, experience, and salary.

ASSISTANTS WANTED.

A COMPETENT ASSISTANT, for good-class Retail and Dispensing. Particulars and carte to A. B., 54, High St., Stroud, Glos.

ASSISTANTS.—Vacancies on hand for Dispensers, in or out-door, Locum Tenens, Managers, Seniors, Juniors. Half-Timers (students), Improvers, Apprentices. Send for form of application, with stamped address, to Mr. H. JUDD, Pharmaceutical Employment Agency, 29, Gt. Coram St., W.C.

AN ASSISTANT, to take charge of an Open Surgery with Retail at the West-end. No Sunday duty. Apply by letter. M. D., 3, Maddox St., Regent St.

AN active ASSISTANT. In-doors. Obliging and a good Salesman. Also an IMPROVER. Apply, stating all particulars, with references and carte (to be returned), to CORFE, Chemist, Maidstone.

ABOUT the 6th.—A JUNIOR. Not under 20 or over 22. To give his whole time. Hours 8 till 10, with alternate Sunday duty. 1 only kept. Apply personally, or with carte, stating age, height, salary, &c., to W. G. TAPLIN, 75, Hampstead Rd., N.W.

AN ASSISTANT, as Dispenser. Minor qualification. Apply, personally if possible, to STICKLAND & ROWE, 23, Cromwell Pl., South Kensington.

TO MANAGE a Branch. Time to study if required. H. BAILEY, Queen's Rd., Buckhurst Hill.

AS MANAGER, in light business. Salary £45 to £50. In-door. Single. Age 25 to 30. An opportunity for a young man wishing to commence. Apply to Mr. F. POTT, Chemist, Post Office, Lower Tranmere, Birkenhead.

IMMEDIATELY.—An ASSISTANT. Qualified. Age 24 or 26. Accustomed to good-class Retail and Dispensing. With satisfactory references. Apply to H. A. CARTER, 165, Edgware Rd., W.

THE end of July.—A competent ASSISTANT, accustomed to a Dispensing and Family business. Churchman preferred. State height, age, and salary required. In-doors. Apply, R. M. PRATT, Chemist, Otley, Yorks.

IMMEDIATELY.—A thoroughly competent Senior ASSISTANT, with good address and accustomed to first-class Dispensing. Apply, stating references and salary required, to Messrs. COUPLAND & SON, High Harrogate.

IMMEDIATELY.—An active ASSISTANT, about 25, of good address. Also an IMPROVER. One just out of apprenticeship. Personal applications. If by letter, send carte, height, salary (in-doors), with whom, and how long in last situation, to G. MORRIS, Chemist, Green Lanes, London, N. (Business hours 8 a.m. to 10 p.m. Sundays, 5 to 10 p.m., alternately).

A GOOD JUNIOR or otherwise. Must be a good Dispenser and well up in the general Retail. Of good address and references. Address, J. J., Chemist, Aldeburgh-on-Sea, Suffolk.

EKIN & APPLEBY, Pharmaceutical Chemists, Bath, require a Senior ASSISTANT who has had good experience in Dispensing. The engagement may commence from any day in July.

IN a good-class business. Hours moderate. A competent ASSISTANT, of active business habits and good appearance. Strict honesty, sobriety, and business tact indispensable. Unmarried. Out-door. Full particulars of height, age, references, &c., also photo. (returnable), to S. GOSS, Pharmaceutical Chemist, Barnstaple.

AN ASSISTANT. About 21. In-door. Must have been accustomed to a Dispensing and Family trade. State age, height, salary, and when at liberty. Address, CHEMICUS, care of Mr. Drew, 13, Lever St., Manchester.

ASSISTANTS WANTED.

JUNIOR, accustomed to Dispensing and good-class Family trade. Applications, with full particulars of qualification, age, salary required, and references, addressed to ALEXR. BOTTLE & Co., Dover.

A COMPETENT ASSISTANT, with Minor qualification, as Dispenser in a good Dispensing and Family business. Apply to M. P. S., 45, Craven Rd., Westbourne Ter., W.

IMMEDIATELY.—A qualified in-door ASSISTANT for a first-class West-end Retail and Dispensing business, where 1 is kept. Age 24 to 28. Of good appearance and address. Liberal and progressive salary. Apply, personally or by letter (enclosing carte), to GAMBLE & Co., 4, Edwardes Ter., Kensington, W.

A COMPETENT ASSISTANT, in-door, with unexceptional references, to take principal charge of the business. Permanent. J. P. BOYCE & SON, Pharmaceutical Chemists, Chertsey.

A JUNIOR ASSISTANT. Accustomed to Mixed country business. Apply, stating references and salary required, W. H. JONES, Chemist, Mountain Ash, S. Wales.

AN ASSISTANT. Immediately. Apply, T. DEIGHTON, Pharmaceutical Chemist, Bridgnorth.

IMMEDIATELY.—A gentleman of good experience, to assist in the MANAGEMENT of a first-class Family and Retail business. In-door. Good references indispensable. Apply, stating age, height, salary required, with references, and enclosing carte (to be returned), to W. T., care of Messrs. Maw & Co., London.

A JUNIOR ASSISTANT, about 21 years of age, who can be well recommended. Apply personally, or if by letter, state age, experience, salary expected, and when disengaged, M., 346, Essex Rd., London.

COMPETENT Junior ASSISTANT, capable of taking Management of Branch business. In-door preferred. PHARMACEUTICAL CHEMIST, 190, London Rd., Manchester.

IMMEDIATELY.—A steady, active JUNIOR, with some knowledge of Dispensing. Good writer. In-door. Apply, stating age, height, and salary required, to FLEEMING & SON, Queen Sq., Wolverhampton. Applications not answered in 3 days declined.

ABOUT the middle of August. An active JUNIOR, of good address, accustomed to a good-class country business. Apply, stating age, height, salary, and last reference, to P. WILLIAMS, Pharmaceutical Chemist, 21, West St., Horsham.

IMMEDIATELY.—A qualified ASSISTANT, to Manage a light Retail business for a widow. State age, height, references, and salary required, to D. E. F., care of Messrs. Evans, Gadd & Co., Exeter.

IMMEDIATELY.—An in-door ASSISTANT, of steady habits, in Dispensing and light Retail business. Must be a competent Dispenser. Good Junior treated with. State salary, experience, references, &c., to W. C. B., Messrs. Evans, Sons & Co., 56, Hanover St., Liverpool. Not replied to in 3 days respectfully declined.

IMMEDIATELY.—An APPRENTICE, in-doors, in an old-established Family business. Comfortable home, and every opportunity for acquiring a thorough knowledge of the business. Premium moderate. Apply, JAMES WELLINGTON, Chemist (by Examination), High St., Oakham.

ASSISTANT, at once, to attend light Retail, Dispensing, and Book-keeping. Time for reading. Good references required. Apply, before 12 or after 6, at 139, Hanbury St., E.

IMMEDIATELY.—An ASSISTANT, out-door, about 23 years of age. Apply to WILLIAMS & Co., 142, High St., St. John's Wood, N.W.

BUSINESSES FOR DISPOSAL.

£110.—Cambs. Light Retail and PRESCRIBING. Unopposed. Several good villages near. With heavy goods trade could be much increased. Rent of house and shop £10. Vendor taking larger concern will take £110. Mr. BRETT, Valuer, Leicester.

RETAIL and Dispensing BUSINESS. In good thoroughfare. Might be greatly increased by the addition of Dentistry. Full particulars and satisfactory reasons for disposal. Address, BETA, 98, Widemarsh St., Hereford.

KENT.—A small select BUSINESS. On account of ill-health. Address, D. T., R. Brice, Esq., Eschol Villa, Billing Rd., Northampton.

ISLINGTON, N.—Proprietor purchasing larger concern, offers a well established and lucrative Prescribing, Dispensing, and Retail BUSINESS. Full prices. Low rent and long lease. Returning over £700 per annum. Profits £400. Every particular to bonâ fide purchaser. Price £650. No agents. Address, CHEMICUS, 4, Richmond St., Barnsbury, N.

PARTNER wanted, sleeping or active, with about £2000, in the Chemical and Scientific Apparatus Business. Only principals will be dealt with. Address, L 99, care of Charles Birchall, Advertising Agent, Liverpool.

IMMEDIATELY.—Splendid chance for an energetic young man. Midland town. BUSINESS, with Post Office attached, which more than pays rent. Returns 4 years ago £900, last year £1300. Capable of much further increase. Every information given. Price £750 cash. Apply, P. O., care of Daniel, Wholesale Patent Medicine Dealer, Derby.

GLOUCESTERSHIRE.—A genuine Country Retail, Dispensing and Prescribing BUSINESS. Unopposed. Fair prices. Manufacturing and Agricultural district. May be greatly increased by heavy trade. Well ordered stock. Under £300 cash. Good shop and fittings. 7-roomed house, cellars, offices, large gardens, and warehouse. Rent £25. Open, central position, and healthy air. 1500 population of village. Handsome and frequented. By letter, W. B., Hearon & Co., 5, Coleman St., E.C.

A CHEMIST'S BUSINESS. Good shop. Well fitted and stocked. Stands well in a good thoroughfare and populous district in a Midland County. A favourable opportunity for an energetic young man to commence. Rent low. Stock at valuation. Apply, FLEEMING & SON, 11, Queen Sq., Wolverhampton.

THE most handsomely fitted SHOP in Manchester. Doing good Retail and Dispensing, at full prices. Leading thoroughfare in a populous neighbourhood. Cost of fixtures and stock £1300. Owner having other engagements will sell for £900, or valuation and goodwill. For particulars apply, J. SOUTHERN, opposite the Assize Courts, Manchester.

A THOROUGH good Family and Dispensing BUSINESS, doing £500 a year. Profits half. Near London. Good neighbourhood. No opposition. Established nearly 50 years. Rent £28. Full particulars may be obtained from J. J. S., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., London, E.C.

S.E.—In a rising neighbourhood. A good class well fitted RETAIL. Doing between £500 and £600. Favourable opportunity for cash purchaser. Pleasant situation. Nice house, and business capable of extension. 13 minutes' from town. K. G., 5, Arthur Rd., Tollington Rd., Holloway, N.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer :—HANTS. Handsomely fitted Retail. Best position in the town. Returning £550. Trial allowed. £350. Another. Returning £600. Same hands 16 years. ISLE OF WIGHT. Leading position. Returning £400. Rent £26. Same hands 7 years. £250. SUSSEX. Facing sea. Elegantly fitted. Net profit after paying everything £900. Trial allowed. £1800. ESSEX. Showing net profit £300. Good house. Rent £30. £450. Another. 14 years in same hands. Entirely unopposed. Rapidly increasing locality. Returning £750. Delightfully situated. £700. SURREY. Rare opportunity to beginner. Totally unopposed. Only wants seeing. Returning £5. Only £95. LONDON, N. Main thoroughfare. Now neglected. Returning £7 weekly. £165. Please apply, 30, Jewry St., Aldgate, City.

MIDLANDS.—Old established light RETAIL. In very pretty, historical and much frequented town of moderate size. Noble shop and good residence. No heavy trade. Returns, which are capable of extension, £1000. Price £800. Mr. BRETT, Valuer, Leicester.

£300.—In a good thoroughfare. A profitable Retail, Dispensing and Prescribing BUSINESS. Returns £350, and steadily increasing, at full prices. Rent £30. 8-roomed house. Good chance for beginner. Ill-health cause of sale. C. H. B., Messrs. Meggeson & Co., 14, Miles Lane, London, E.C.

LANCASHIRE.—In consequence of the death of the proprietor. An old established Retail, Prescribing and Dispensing BUSINESS. Handsome shop and convenient premises, commanding the best position in the town. To be sold at a valuation of the stock, fixtures, and goodwill. Capital required about £2000. Apply, CHEMICUS, Messrs. Evans, Sons & Co., Liverpool.

CHEMIST. Brixton. An established Retail and Prescribing BUSINESS. Commandingly situated. Rent £80, on lease. Incoming low. Apply, C. & D., Cooper & Glover, Estate Agency Offices, Brixton, S.W.

DEATH vacancy. A Retail, Dispensing and Prescribing TRADE. Situated in a very increasing locality, S.W. Returning average £900 to £1000, at full prices. Takings in cash last week £17, irrespective of booking. Every investigation allowed, and part purchase can remain if desired. Rent £75. Price £650 to sell at once. Apply, by letter only, ALPHA, 5, South Lambeth Rd., S.W.

NEATLY fitted corner SHOP. House attached. £16 clear. Returns £328. Teeth £6. Could be greatly improved. No opposition. Best prices obtained. 3000 population. Improving, healthy locality. Light Retail and Prescribing, Cattle Medicines, Paints, &c. Good Prescriber and Dentist would do well. Reasonable offer accepted. STATIM, A. Greaves & Son, Chesterfield.

IMMEDIATELY.—A small BUSINESS in a thickly populated and fashionable suburb of Sheffield. Capital chance for a young man just starting. Satisfactory reasons for leaving. Apply, Mr. JOSEPH HARDY, 9, Norfolk Row, Sheffield.

IMMEDIATELY.—The valuable Stock-in-Trade, Fixtures, Goodwill, &c., of the late Thomas Brooke Senior. The business having been successfully carried on by Mr. Senior for 24 years, renders the opening a very desirable one for an active and energetic man. Price £250. Apply, No. 14, Kirkgate, Wakefield.

WANTED TO PURCHASE.

A LIGHT RETAIL. In a small town in South or South-West of England. Garden preferred. No agents. Strict confidence observed. Address, TENAX, care of Southall Brothers & Barclay, Birmingham.

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

GENTLEMEN seeking Businesses are requested to write to H. G. for information respecting any of the following, quoting No. and Letter.

		Returns.	Net Profits.	Terms.
Y	23	1585	528	£1000
B	33	1000	375	825
D	30	2500	600	600
T	19	800	300	700
E	16	700	300	600
A	6	700	350	600
B	7	600	—	550
D	27	520	250	400
S	32	380	160	350
M	14	400	200	350
P	29	400	200	300
C	31	250	—	250 or offer
C	12	500	250	250 ,,
W	2	2000	600	Valuation & Goodwill.
P	8	550	220	£100 and Valuation.
H	28	900	400	Valuation.
M	9	352	176	,,
B L	25	250	150	,,
S	11	150	75	,,
L	15	150	—	,,

The above are taken from H. GADD'S List, and will bear the strictest investigation.

MESSRS. TENCH & TAYLOR

Chemists' Valuers and Transfer Agents,

WALBROOK CHAMBERS, 38, WALBROOK,

LONDON, E.C.

HAVE FOR DISPOSAL :—

1. LONDON, W.—Retail and PRESCRIBING. Returns £5 weekly, under manager. Price £250. A good opportunity for an energetic man.
2. LONDON, S.W.—Improving suburb. A well stocked PHARMACY. Returns about £450, at full prices. Rent £50, on lease. Price £400.
3. LONDON, N.—Main thoroughfare. Profitable Retail and Prescribing BUSINESS. Returns about £5 weekly. Price, including valuable lease, £150.
4. LONDON, E.C.—Old established Wholesale and Retail BUSINESS. A mere nominal sum for goodwill, and stock and fixtures at valuation.
5. KENT (near town).—Recently established BUSINESS. In growing district. Returns about £8 weekly. Price £450.
6. HANTS.—Good-class light Retail and DISPENSING. Returns over £500. Price £500.
7. SURREY (near town).—Returns about £250. Price about £170. Through illness.
8. SUFFOLK.—Good BUSINESS, with Dentistry. Returns about £900. Capital house and garden. Price £900.
9. SOMERSET.—Old established Country BUSINESS. Returns about £2200. Price about £2000. Satisfactory reasons for disposal.

Messrs. T. & T. have NUMEROUS OTHER BUSINESSES on their Books for disposal, particulars of which will be forwarded post free on application.

No charge to purchasers.

N.B.—Appointments for valuation should be made (if possible) at least seven days beforehand.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 628.] SATURDAY, JULY 8, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

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Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

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The Victoria property is only about 30 miles from the celebrated El Callao Gold Mine, one of the Richest in the World.

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ABRIDGED PROSPECTUS.

This property is located in the same geological belt of country (but in a richer and later discovered district) as the renowned Mine El Callao, which at present may be taken to be the most productive gold mine in the world. This mine produced, in the year 1881, the large quantity of 65,000 ounces, or over 2 tons of gold; this, calculated at £3 17*s.* per ounce, gives a gross return of £250,250, an extraordinary yield for twelve months. Since its discovery upwards of 3 million pounds sterling worth of Gold has been returned. The weight of the Gold bars sent to Messrs. Baring Brothers, London, according to advertisements in the *Mining Journal*, was as under:—

	ozs.
For month of December, 1881	6,597 $\frac{96}{100}$
" January, 1882	8,115 $\frac{51}{100}$
" February, 1882	11,183 $\frac{08}{100}$
" March, 1882	9,609 $\frac{30}{100}$
" April, 1882	8,431 $\frac{73}{100}$
TOTAL for the 5 months' return ...	43,919 $\frac{58}{100}$

OR

Equal to over £160,000 sterling.

Mr. DANBY, in his report, states that he took haphazard samples of quartz from different parts of the property, and brought them with him to London, from these were taken six fair samples, and sent to Messrs. Johnson & Matthey, the Assayers to the Bank of England and H. M. Mint. A statutory declaration has been made, that these identical samples were taken from the Victoria property; the result is most astounding, and has seldom been equalled.

CERTIFICATE OF ASSAY.

Assay Office and Ore Floor,
Hatton Garden, London, E.C.
March 9th, 1882.

We have examined the sample of Mineral marked as under, and find the following to be the result:—

		ozs.
Average of Six samples.	Produce of Gold	122-500
	Silver	8

per ton of 20 cwt. of ore.

(Signed) JOHNSON, MATTHEY & Co.

Mr. Danby estimates that there are about 450,000 tons of Gold Quartz which could be carried out averaging from 1½ to 6 ozs. of Gold per ton (differing from most other mines where deep sinking on the lodes or reefs is necessary to obtain any result), which can be quickly turned into profit for the Shareholders at a very small outlay for stamping machinery. In "The Victoria" the Engineer states it is more a question of Quarrying than Mining.

Taking then, the estimate of the Gold Quartz which can thus be so easily got at, the moderate calculation of 250,000 tons only, and the low estimate of its yield of Gold, at say two ounces and a half per ton, this would give the enormous amount of about Two Millions and Fifty Thousand Pounds sterling worth of Gold, immediately available as soon as the necessary machinery is erected, and without the ordinary expensive Mining operations, and every ounce of Gold per ton in excess of this estimate of two ounces and a half which the Quartz yields will add nearly One Million sterling to the receipts.

It is well within the range of probabilities that the property to be purchased, will, with more extensive development, equal if not surpass the celebrated Callao Mine, for by the report referred to there will be seen the great advantage it possesses, viz.:—the immense outcrop, the massive character of the lodes, the general rich value of the Quartz and the water power.

It is proposed to proceed with vigorous development forthwith and to commence operations with the enormous outcrop or surface Quartz, so as to obtain quick returns, and it is confidently anticipated that within a short time very large profits will be made and dividends available.

Prospectus and Form of Application can be had on application to the Secretary, Solicitor, Bankers of the Company, or Messrs. S. POWELL & Co., Gracechurch Bldgs., London, E.C.

Samples of the Quartz may be seen at the Company's offices.

PHOSPHORISED COD LIVER OIL

Was *introduced* to the Profession by Messrs. SAVORY & MOORE. The advantage of this (the ORIGINAL) preparation over the imitations of it consists in the ability to administer a SUFFICIENT dose of Phosphorus without the admixture of a LARGE quantity of Cod Liver Oil. Dose, 1 to 2 drachms. Supplied in bulk or small bottles.

PEPTODYN.

A Combination of the whole of the Digestive Secretions — Pepsine, Pancreatine, Diastase, or Ptyalin, &c., forming a valuable remedy in the treatment of all forms of Dyspepsia, and Diseases arising from imperfect nutrition. Dose, 3 to 5 grains.

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A Non-Saccharine Substitute for "Chemical Food."
(Dr. FREDERICK CHURCHILL, Victoria Hospital for Children.)

VIN. FERRI HYPOPHOSPH. CO.

(Dr. FREDERICK CHURCHILL, Victoria Hospital for Children.)

Solutions of the Hypophosphites of Iron (Ferrous Salt), Lime, Magnesia, and Soda, obtained without the aid of sugar or strong mineral acids, which have been used with marked success at the above-named Hospital as TONIC, ANTACID, and STOMACHIC REMEDIES — of special value in the treatment of Diseases of Children, and free from the objectionable characteristics of the Saccharine "Chemical Food," and the uncertain composition of "Steel Wines." Vide *British Medical Journal*, March 27, 1880.

Dose—of the Liquor, minims 15 to 60; of the Vinum, 1 to 4 drachms, to be diluted. Supplied in any quantities required.

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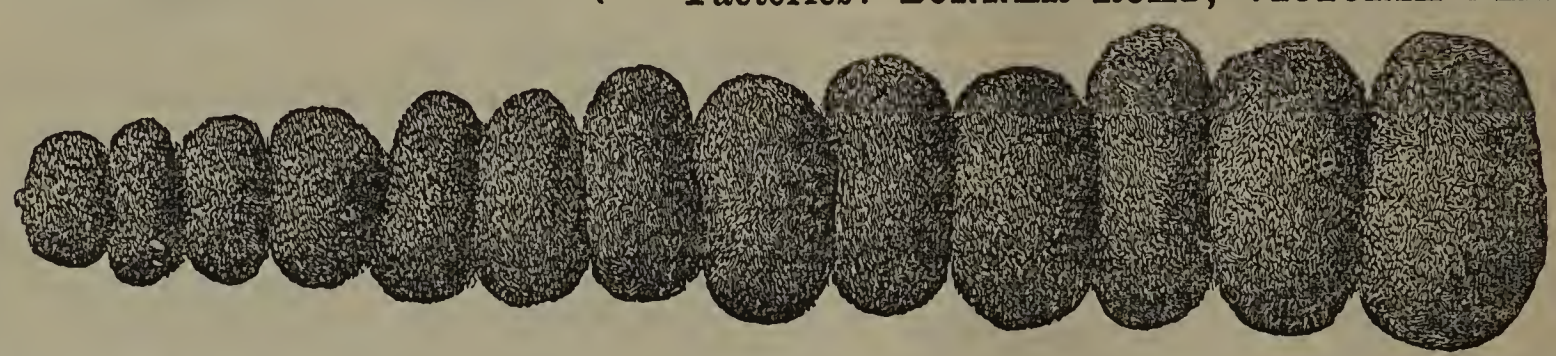

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HONEYCOMB SPONGES, on strings, as illustrated, from 4/- to 42/- per doz., also washed perfectly light and free from sand at per lb. **WEST INDIA HONEYCOMB**, 19/- per lb. **BEST SMYRNA CUPS**, perfectly light or slightly sanded. **HONEYCOMB AND TURKEY SPONGES**, in original cases.
EGYPTIAN LOOPHARS of very superior quality, at 6/-, 8/-, 10/- and 12/- per doz.
SPONGE NETS, No. 1, 5/6; 2, 7/6; 3, 9/-; 4, 12/-; 5, 15/- *Illustrated Priced Catalogue post free on application.*

FRY'S COCOA AND FRY'S CHOCOLATE

Are combinations of FRY'S PURE COCOA EXTRACT and CHOCOLATE PASTE with ALLEN & HANBURYS' CONCENTRATED EXTRACT of MALT, affording delicious beverages. The Extract may be most agreeably taken in either of these forms. Sold in tins at 1s. and 2s. each, 9s. and 18s. per dozen. The COCOA is in the form of Powder, the CHOCOLATE of PASTE, and sweetened.

Lancet, December 18th, 1880:—"This is an excellent preparation of Cocoa and Malt Extract. It is dried at a gentle heat, to avoid injury to the diastase; its dietetic and digestive value is beyond all dispute, and it is very agreeable in flavour."

See also—*British Medical Journal*, Nov. 13th, 1880; *Medical Times & Gazette*, Jan. 1st, 1881; *Medical Press*, Jan. 26th, 1881.

To be had of the Manufacturers, all Wholesale Houses, or from

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DR. J. COLLIS BROWNE'S
CHLORODYNE
THE ORIGINAL AND ONLY GENUINE.

IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & CO., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

DEAR SIR,—Have the goodness to furnish us with your best quotations for Dr. J. COLLIS BROWNE'S Chlorodyne, as, being large buyers, we would much prefer doing business with you direct than through the wholesale houses. We embrace this opportunity of congratulating you upon the wide-spread reputation this justly-esteemed medicine has earned for itself, not only in Hindostan, but all over the East. As a remedy of general utility we much question whether a better is imported into the country, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances, *ad infinitum*, of the extraordinary efficacy of Dr. COLLIS BROWNE'S Chlorodyne in Diarrhœa and Dysentery, Spasms, Cramp, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than COLLIS BROWNE'S, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than COLLIS BROWNE'S is a deliberate breach of faith on the part of the chemist, to prescriber and patient alike.

We are, Sir, faithfully yours,
SYMES & CO.,
Members of the Pharmaceutical Society of Great Britain,
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith unjust to patient and physician. The value of the remedy *alone* creates the great demand.

Sold in Bottles—1*s.* 1½*d.*, 2*s.* 9*d.*, 4*s.* 6*d.*, and 11*s.* Usual Discount to the Profession.

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J. T. DAVENPORT, Pharmaceutist,

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CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED), LONDON."

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R. HAMPSON prepares the Pills of the Pharmacopœia, and a great variety of Pills from useful formulæ. The Pills are made of the best ingredients, and being *quickly* diffusible always give satisfaction. A Price Current and sample post free. Supplied direct or through the Wholesale Houses. Special quotations for large quantities.

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Are one of those rare Medicines which, for their extraordinary properties, have gained an almost **UNIVERSAL REPUTATION.** During a period of more than Forty-six Years they have been used most extensively as a **Family Medicine**, thousands having found them a simple and safe remedy, and one needful to be kept always at hand. These Pills are purely Vegetable, being entirely free from Mercury or any other Mineral, and those who may not hitherto have proved their efficacy will do well to give them a trial. Recommended for disorders of the HEAD, CHEST, BOWELS, LIVER, and KIDNEYS; also in RHEUMATISM, ULCERS, SORES, and all SKIN DISEASES—these Pills being a direct purifier of the Blood. In boxes, price 7½d., 1s. 1½d., and 2s. 9d., by G. WHELPTON & SON, 3, Crane Court, Fleet Street, London, and sent free to any part of the United Kingdom on receipt of 8, 14, or 33 stamps. Sold by all Chemists at home and abroad.

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WHOLESALE DRUGGISTS

AND

Manufacturing Pharmaceutical Chemists,

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Is neat, clean, and convenient for use. Being airtight & odourless, retains its strength unimpaired. In 1-lb., ½-lb., and ¼-lb Packages, packed into 24-lb Boxes and 50-lb. Cases, each separately, or the three sizes assorted in each Box or Case. Penny Packages, in 1-gross Boxes.

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NATIONAL CHEMICAL CO., 29, Suffolk Grove, Great Suffolk Street, S.E.

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NOTICE.—*Renumbering of Oxford Street. Our number is altered from 252 to 489.*

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BENZINE COLLAS

Which is acknowledged on all hands to be the most reliable Preparation for removing Grease, Oil, Tar, Wax, or Paint from every description of Wearing Apparel or Household Stuffs. It neither injures the colour or texture, nor leaves any odour or stain. It is neatly got up, and is a most saleable article. Observe the word "COLLAS" on label and cap.

1000 HANDBILLS, WITH NAME AND ADDRESS,

Will be printed for any Chemist who gives an order for

£1 WORTH of BENZINE COLLAS,

At the following prices, viz.:—

6d. Size	...	4s. per dozen,	subject to Discount.
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WELCH'S FEMALE PILLS.

These are universally acknowledged to be the Genuine, and Druggists may safely recommend them.

CAUTION!

The Proprietors of Kearsley's Original Widow Welch's Female Pills find it incumbent on them to caution the purchasers of these Pills against various imitations by parties who have no knowledge of their peculiar preparation, the Original Recipe having been sold to the late G. Kearsley, of Fleet Street, whose Widow found it necessary to make an Affidavit, for the protection of her property, in the year 1798. The Genuine Recipe for **Widow Welch's Female Pills** has been prepared by them for more than **Seventy Years!** Chemists are particularly requested to remark that, as a testimony of authenticity, each bill of directions contains an Affidavit, and bears the signature of "C. KEARSLEY," in writing, also engraved on the Government Stamp, and each box is wrapped in WHITE paper

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Supplied with all Orders for One Dozen (13) Boxes,

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Special Quotations to Shippers and for large quantities, on application to

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IMPORTANT NOTICE.

LYNCH'S ENEMAS

(*Nos. 435C and 435D*),

REQUIRING NO METAL MOUNTS.

It having come to our knowledge that an attempt is being made to deter our customers from purchasing and selling the above Enemas, under the pretence that they are an infringement of another Patent, we hereby guarantee all who desire to purchase and sell same against all risks of any kind whatsoever with which they may be so threatened, and will undertake and carry to a conclusion any law proceedings which may be taken against them.

Further, we will esteem it a favour if any of our customers who may be subject to any annoyance of the kind indicated above will communicate at once with us, so that we may be furnished with evidence upon which to take such legal proceedings as will save them from a repetition of the indignity.

LYNCH & CO.

Aldersgate Street, London, E.C.
15th March, 1882.

THERMO-MICROSCOPY IN PHARMACY.

BY W. H. SYMONS, F.R.M.S., F.C.S.

(*Concluded from page* 4.)

The Melting Point of Resins.—Time and mass have almost as much to do with the melting of a resin as temperature, as may be seen by the ease with which Burgundy and common pitch flow at normal temperatures, and accommodate themselves to their surroundings. To render mass a constant factor, the resin to be examined is coarsely powdered, the finest particles sifted off through fine muslin and the largest separated by means of the same material of fewer meshes. The particles of intermediate size being chosen, a few are placed on the warm stage, as in the case of wax, except that it is advisable to use a shallow cell to keep the thin glass cover from the resin. The focus having been adjusted, heat is applied so that the temperature shall rise a definite number of degrees per minute, say five. By so doing time is rendered a constant factor. The resin is kept continually in view until the sharp angles suddenly round off and a drop is formed. The following are some results:—

Resin from tolu	60° C.
Guaiacum resin	75° C.
Common resin	80° C.
Scammony resin from root	110° C.
Scammony resin from gum	125° C.
Tampico jalap resin	130° C.
Vera Cruz jalap resin	150° C.

It will be noticed that according to the above list the resin of scammony prepared from the root has a lower melting point than that prepared from the gum. The two resins are commonly asserted to be identical. Several specimens were examined, some prepared by myself, others guaranteed as genuine, and although by using various methods sundry melting points could be obtained, they invariably occupied the same order on a list. In one case thin glass tubes, about the size of a quill, were partially filled with the resins and plunged into mercury, so that the resin should be about 1 cm. below the surface of the metal, and heat applied; when the resin rose to view the temperature was noted. By the hot stage process as accurate results can be obtained as by any other, and it possesses the great advantage of requiring only a few milligrams of the resin for each determination.

The Melting and Subliming Points af Alkaloids.—These are now admitted data in their examination. Various methods have been suggested for taking them, perhaps the best being that of Mr. Wynter Blyth. He takes a porcelain crucible, nearly fills it with mercury or fusible metal; places a minute speck of the substance to be examined on a thin disc of microscopic covering glass and floats it on the metal; the cell is completed by a glass ring and upper disc. The crucible is supported on a hot plate, and is protected from the unequal cooling effects of currents of air by being covered with a flask from which the bottom has been removed. The neck of the flask conveniently supports a thermometer, which passes through a cork, its bulb being immersed in the bath of liquid metal. "In the first examination of a substance the temperature is raised somewhat rapidly, taking off the upper disc with the forceps at every 10°, and exchanging it for a fresh disc, until the substance is destroyed. The second examination is conducted much more slowly, and the discs exchanged at every 4° or 5°, whilst the final determination is effected by raising the temperature with great caution, and exchanging the discs at about the points of change (already partially determined) at every ½°. All the discs are examined microscopically."* This method is exceeding simple in application, but at the same time tedious; the chief objection seems to be that the apparatus has to be disturbed at every ½°, and this may interfere with the result.

Using the hot stage, above described, the process may be watched throughout, not once disturbing the parts, unless it be thought advisable to make a permanent slide for future reference, at any point. Moreover, the alkaloid and its sublimate can, in many cases, be alternately viewed by merely adjusting the focus.

The following results merely refer to a preliminary examination, and are not put forward as carried out to the tenth or even to half of a degree. The alkaloids examined were commercial specimens, and the presence of water, as water of crystallization and otherwise, may have considerably influenced the result. The subject is an exceedingly interesting one, and I hope to be able to pursue it much further. In no instance is it likely that the temperature mentioned is too low. Like evaporation in the case of liquids, sublimation in that of some solids appears to take place incessantly at all temperatures. The resultant sublimate, however, may not appear until after the lapse of some time.

The alkaloid to be examined is placed like the resin, the glass stage and cover being alternately focussed. The formation of a nebula will, in many cases, be apparent first to the unaided eye, magnification simply dispersing and making it less visible. As soon as the nebula is capable of resolution into dots or drops a high power may be used, but a ½ or 1 inch glass is quite powerful enough to resolve any sublimate worthy of the name, and these low power objectives can be focussed down to the glass stage without removing the cover.

Theine.—This body, which is asserted by various authors to yield a sublimate at points varying from 79·5° C. to 184·7° C., gave its characteristic sublimate in fair size crystals, at 65° C. It sublimed so quickly that it underwent no further change as the temperature increased.

Quinidine.—At a temperature of 75° C. melts (in its own water?), but soon after crystallizes again and does not further alter until 150° is reached, when droplets begin to condense on the cover glass; at 170° the mass again melts. No other change appears to take place until it darkens at 240° and further decomposes at 260°. The sublimate solidifies but does not crystallize.

Quinine.—At 150° C. a slight cloud, resolved by a high power into numberless droplets, forms on the cover glass, while the mass of the alkaloid on the stage throws out long acicular crystals, some of which are very curiously branched. As the melting point (about 170°) is neared, the particles heave and throb like living monsters and rapidly assume the fluid state. If the heating be continued for a short time the cover glass will be found coated with silky crystals, which hang in graceful festoons from its surface, a temperature of 200° giving the best results. Melted quinine solidifies if left undisturbed at about 125°.

Cinchonine.—Clouds at 160° C., and very slowly

* 'Practical Chemistry.' By A. W. Blyth, M.R.C.S., Griffin and Co. 1879. Page 285.

at 180° gives acicular crystals. The residue becomes a charred mass at 260°, but is completely enveloped in efflorescent crystals.

Cinchonidine.—Clouds at 160°, gradually forming a curious network of crystals. It melts at about 205° and remains liquid until cooled down to about 160°, when it suddenly becomes a mass of crystals. The solidification of this and other melted alkaloids can, however, be brought about at much higher temperatures by the introduction of a crystal or other nucleus.

Codeine.—Begins to sublime about 140° C. The sublimate appears as small drops, but, although the temperature be rising, these suddenly become massive irregular crystals. Codeine melts about 150°.

Morphine.—Begins to sublime about 150° C., forming but a slight cloud on the cover, and it is not until about 220° is reached that sublimation proceeds freely, and crystals form. At 240° the alkaloid melts and begins to brown.

Aconitine.—Melts at about 110° C., a slight cloud forming on the cover glass and gradually accumulating into drops, some of which eventually become crystals. The liquid alkaloid browns at about 180°. It cracks on cooling.

Veratrine.—Melts at about 140° C. Browns at 210°, only yielding a slight nebula on the cover, and this needs a high power to resolve it into dots.

Strychnine.—Sublimes slowly at 180° C. in short needle-like crystals; as the temperature rises to the melting point of the alkaloid, about 225°, sublimation proceeds more rapidly.

The sublimates of most of these alkaloids answer the same tests as the alkaloids themselves, but it would be interesting to make a more complete examination to ascertain if any constitutional change had been undergone, as it is well known that some of them, *e.g.*, morphine, are very much changed by being heated in closed tubes.

Sublimation of Inorganic Bodies.—Arsenious Anhydride.—By the hot stage I found that this substance sublimes slowly at 95° C. Beasley, in his 'Chemist and Druggist's Receipt Book,' 5th ed., p. 455, gives as the subliming point of arsenic 380° F. (=193° C.). A more recent writer gives it as 280° F. (=137·7° C.). But that both of these observations deviate more than 70° F. from the truth may be proved by anyone who cares to place a few milligrams of arsenic, enclosed between two watch glasses, over a water-bath; in time a distinct sublimate will condense on the upper glass, and, in point of fact, arsenic will be found to sublime slowly at 205° F.

Calomel.—Sublimes at 110° C. The sublimate consists of well defined crystals, belonging to the right rhombic prismatic system, not unlike those of Rochelle salts.

The following slides have been placed in the Library of the Pharmaceutical Society illustrative of this paper:—

Beeswax and other bodies showing fat crystals.

Potato starch, which has been subjected for forty hours to a temperature of 60°. This slide shows various stages of tumefaction in different granules.

Scammony resin, small particles before and after melting.

Sublimates of the following alkaloids:—Theine, quinine, cinchonine, cinchonidine, codeine, morphine, aconitine and strychnine. Also sublimates of calomel and arsenic.

These sublimates of the alkaloids must not be considered as wholly characteristic, but rather as forms into which most of them could be made to pass by suitable treatment. Polarized light affects them variously, and is sometimes useful for their early detection on the cover glass. Calomel crystals not only display brilliant colours under polarized light, but are themselves analytic, so that this effect can be obtained without the use of the upper Nicols prism.

NOTE ON ALUMEN, B.P.

BY W. WATSON WILL.

Ammonio-aluminic sulphate manufacture seems to have become a thing of the past and great difficulty is now experienced by pharmacists in obtaining it, the potassic salt having entirely taken its place. No doubt the consumption of alum from a pharmaceutical point of view is small in comparison to the enormous quantities used in the arts and manufactures of this country, but I think if there had been a persistent demand, however small, for ammonia alum, its manufacture would not have become obsolete. In a communication I had from Mr. R. King, of Glasgow, some time ago, he assured me there was no demand for ammonia alum, a statement fully endorsed by Mr. P. Spence, of Pendleton, in a note I had from him regarding this subject. Various have been the processes employed in the preparation of ammonia alum, some makers preparing the aluminum sulphate from aluminous schist or shale, others using clay or kaolin. The following is a brief *résumé* of one of the processes:—Shale of coal measures, previously calcined, is placed in iron vessels lined with lead, and sulphuric acid from an adjoining receiver is poured over it; the mass then allowed to digest at a temperature of 240° F., this degree of temperature being sustained by a fire underneath the vessels and also by steam and ammonia vapour being blown into the pan. The solution, after evaporating for some time, is poured into large coolers and strongly agitated to prevent formation of large crystals. The deposit of fine crystals, commonly called "flour alum" is now washed and redissolved by steam, and the solution run off into large vessels called "roaching casks" to crystallize. After seven or ten days the staves of these "casks" are taken off and a complete shape is left of crystallized alum. A few holes are made in the side of this mass, and the mother-liquors allowed to drain off; then it is broken and packed for sale. Other makers, instead of adding ammonia in a state of vapour, more generally used the chloride or sulphate made by neutralizing ammoniacal gas liquor with hydrochloric or sulphuric acid; the former of the two solutions was mostly used on account of the amount of iron contained in the crude aluminum sulphate. Following the latter of the two processes just mentioned, I would suggest a short mode for the preparation of ammonio-aluminic sulphate, easy in manipulation, adaptable to small laboratories, and satisfactory in result. Take of aluminum sulphate (cake alum) 14 lbs., ammonium sulphate 3½ lbs., warm water 4 gallons; dissolve the ammonium sulphate in half a gallon of water and the aluminum sulphate in the remainder, filter the solution to free it from the finely divided silica, and to the filtered liquid add the ammonia solution; then apply heat until the solution boils, pour off into a suitable vessel to crystallize. After a few days draw off the mother-liquor; then drain the crystals on a

loosely stopped funnel. One hundred grains of ammonia aluminic sulphate made by this process, on being incinerated, left a residue which on cooling weighed 54 grains, corresponding to the requirements of the Pharmacopœia.

THE ACTIVE PRINCIPLES OF BUXUS SEMPERVIRENS.*

BY P. E. ALESSANDRI.

Box tree bark has already been the object of chemical research by Fauré, Pavia, and more recently Barbaglia of Pisa, who thought to extract from it an alkaloid which would be an efficient substitute for quinine. Pavia claimed the discovery of two alkaloids, which he named *buxine* and *parabuxine*. The supposed alkaloids, however, which the three above-named chemists believed they had extracted were really a mixture of resinous matters of a deep yellow colour. Thinking it necessary from these failures to change the method of extraction, the author used his oxalic acid process, which has already been described in the *Pharmaceutical Journal*, vol. xii., p. 993.

Dried and fresh leaves and bruised bark were macerated for twenty-four hours in a strong solution of oxalic acid. The clear yellow supernatant liquid was poured off and filtered, and gave the following reactions:—

Tests.	Precipitates.
Liquor ammoniæ	Greyish-yellow, copious.
Caustic soda	Greyish-yellow, moderate.
Sodic carbonate	Greyish-yellow, slight.
Liquor ammoniæ and tannic acid	Dirty-yellow, copious.
Platinum chloride . . .	Yellowish-white.
Tincture of iodine . . .	Brick-red.
Mercuric chloride . . .	Yellowish-white.
Sodic phosphomolybdate .	Dirty-yellow.
Fehling's liquid	Reduced by heat.

The solution was then fully precipitated by a slight excess of ammonia, the precipitate washed and dissolved in dilute acetic acid, a greenish substance remaining undissolved. The acetic solution was once more precipitated with ammonia and the precipitate dissolved in sulphuric acid, again precipitated and washed with dilute ammonia and dissolved in absolute alcohol, in which it dissolves without residue. The alcoholic solution obtained was evaporated, first in the air and then *in vacuo*, and left a residue analogous to that described by Fauré and Barbaglia.

The author found that by the same treatment the leaves and bark yielded different compounds; he consequently made two oxalic solutions, one with the pounded fresh leaves, the second with the pounded bark and small twigs. The first infusion in the cold was treated with sodic carbonate, and heated, and also with liquor ammoniæ.

In the first case the precipitate formed is but small, so the second process with ammonia was adopted. The precipitate being washed and filtered, it was dissolved in acetic acid and again precipitated and dissolved in alcohol, the alcohol evaporated and the residue treated with ether, which on being also evaporated gave a distinctly crystalline substance of a canary-yellow colour. The ether left behind it a soft, gummy, sticky substance, which, being allowed to remain exposed to the air, turned of a greyish-green colour and of a crystalline structure.

The canary-yellow crystalline principle extracted from the leaves dissolves pretty easily in water and ether, and freely in alcohol. It also dissolves readily in the mineral and vegetable dilute acids, giving well-marked crystalline compounds of a light-yellow colour, very bitter, and soluble in water. The sulphuric and hydrochloric solutions gave a precipitate with platinum chloride. The principle is precipitated of a light-yellow colour by phosphomolybdic acid, white with tannic acid, as a cloud with mercuric chloride, and brick-red with iodine. With the alcoholic and ethereal solutions these reactions are not so marked. With pure sulphuric acid it turns of a dark colour. With pure nitric acid it is transformed into a rose-coloured powder.

The oxalic solution made from the bark gave different results. The colour of the ammoniacal precipitate was greyish-yellow and dissolved entirely in dilute acetic acid. Precipitated by an excess of ammonia it gave a very light crystalline precipitate of a light flesh colour which dissolved completely in alcohol. By successive evaporations and treatment with ether a white substance is obtained which crystallizes in brilliant transparent scales.

This body is but little soluble in water and benzene, a little more so in chloroform and carbon disulphide and freely in alcohol and ether. It is also soluble in dilute acids, from which it is precipitable of white colour by ammonia. Tannic acid throws down a yellow precipitate, passing to deep orange; phosphomolybdic acid, white; tincture of iodine, brimstone; chloride of platinum, canary colour; potassic dichromate, canary, turning to orange; and mercuric chloride, white. Pure sulphuric acid turns it of a yellow colour, which disappears on the addition of water. Pure nitric acid gives immediately a reddish-purple colour, which passes into amaranth and then disappears. Treated with caustic potash ammonia is developed. With sulphuric acid and potassic dichromate, it gives a yellow precipitate, which becomes emerald green on heating.

The ethereal solution leaves behind another body formed of amber crystalline scales, very bitter and differing from the last-mentioned body in many particulars. It is soluble in cold dilute alcohol, slightly soluble in water, and insoluble in ether, benzene and chloroform. It is soluble in all the dilute acids and a precipitate is thrown down by ammonia when it is in great excess. Pure nitric acid turns it to a dirty brick-red; hydrochloric acid to a greenish hue, and sulphuric acid first to a dirty-red, and then to a dark-green.

The neutralized acid solution gives a white precipitate with tannic and phosphomolybdic acids and mercuric chloride, yellow with potassic dichromate and brick-red with tincture of iodine.

It is evident that we have to deal with three distinc principles which possess particular characters. The first the author has named *buxine*, the second, *buxeine*, and the third *parabuxine*.

The acetic solution, before referred to, from which the buxine has been precipitated by ammonia, will give a copious white precipitate with tannic acid which will also give a copious greyish-white precipitate with the residue of the oxalic solution remaining after its treatment with ammonia. After an excess of ammonia or potash has been added to the oxalic solution it is still precipitable by tannic acid; but the precipitate cannot be buxine, for with tannic acid this principle is thrown down of a yellowish-red colour.

The chemical and physical characters of the three principles, are as follows:—

	Buxine.	Buxeine.	Parabuxine.
Colour.	White.	Yellowish-white.	Purplish-red.
Structure.	Crystalline.	Crystalline.	Amorphous.
Solubility.	Slightly soluble in water; more so in alcohol; freely in ether.	Soluble in alcohol and ether; slightly so in water.	Freely soluble in water and alcohol, but insoluble in ether.
With HNO_3.	Turns reddish purple.	Turns greenish-yellow, and then brick-red.	Turns greenish-yellow, with no approach to red.
With H_2SO_4.	Turns brick red.	Turns blood-red.	Turns greenish-yellow, and then darkens.

* *Annali di Chimica*, April, 1882.

	Buxine.	Buxeine.	Parabuxine.
With H_2SO_4 and $K_2Cr_2O_7$.	Turns canary yellow in the cold. Gives a green cloud when hot that at once disappears.	An orange precipitate; when heated the precipitate dissolves and gives a green solution.	Gives no precipitate, but with heat gives a grass green cloud.

In the *Buxus sempervirens*, therefore, there are three special and distinct principles, viz., buxine in the bark, buxeine in the leaves, and parabuxine in both, but in the greatest quantity in the former. There appears to be comparatively little difference between buxine and buxeine, and it is just possible that further researches will prove them to be one and the same body; parabuxine, however, is sufficiently distinct from either in both its physical and chemical characters. On the exact nature of parabuxine the author declines for the present to give any decided opinion. It appears sometimes to have an acid reaction, but other experiments tend to prove the contrary. If it could be proved beyond a doubt that it was an organic acid it would explain why it clings so tenaciously to the buxine.

The last method adopted by the author for the extraction of buxine and parabuxine is as follows:—

1. Make a cold infusion of coarsely powdered box bark with a 2 per cent. solution of oxalic acid.
2. Filter and press after twenty-four hours, and exhaust the remaining bark with a fresh portion of oxalic solution, filtering, and press again.
3. Concentrate the infusion at a gentle heat, add ammonia in excess and allow the resulting precipitate to subside.
4. Collect the precipitate on a filter and treat with dilute acetic acid. Precipitate again with ammonia and wash with weak ammonia.
5. Treat the precipitate with hot alcohol and evaporate to one-third.
6. Shake up the residue with ether repeatedly.
7. Evaporate the ether and set aside the undissolved portion.
8. Dissolve again in acetic acid and precipitate. This process gives buxine in a nearly pure condition. This product is nearly white and may be entirely decolorized by animal charcoal, but a large quantity of the alkaloid is absorbed and lost in the process.
9. The portion undissolved by the ether is treated with acetic acid and mixed with the residual liquor of the first treatment.
10. Evaporate the acetic solution slowly down to one-half and treat with ammonia. Collect the yellowish magma on a filter. Evaporate the residual liquor down to one-half, precipitate, unite the two precipitates and wash with weak ammonia water.
11. Wash the magma with ether and dissolve the residue in pure alcohol. This alcoholic solution on evaporation yields nearly pure parabuxine.

Instead of acetic acid dilute sulphuric acid may be used for dissolving the first ammoniacal precipitate and the buxine thrown down with baryta water.

Analogous treatment of the pounded leaves gives buxeine.

The author denies that the alkaloid obtained by Fauré is buxine at all, but a mixture of heterogeneous substances.

Pavia worked with the leaves and twigs and obtained a mixture of buxine, buxeine and parabuxine, but in small quantities. Pavia's second process, in which sulphuric acid was used, did not give the pure alkaloid either, for the solvent dissolved out a number of products upon which a cold solution of oxalic acid has no action; besides which he only used the leaves and twigs and treated the precipitate he obtained with nothing but alcohol, which only gave him an impure mixture, which he took for true buxine.

Barbaglia followed an analogous process, but used sodic and calcic carbonate to precipitate the sulphuric acid solutions, the precipitate being dissolved in pure alcohol. This method of proceeding could not produce pure buxine, because sodic carbonate will not throw down the alkaloidal principles of box leaves or bark. Barbaglia by this means obtained a mixture, which he sought to purify by dissolving it in alcohol and pouring the resulting solution in a thin stream into distilled water. It is true that by this means a white glutinous deposit is formed; this is not pure buxine, however, but a mixture of that substance and parabuxine. This may be proved by a simple experiment which eluded Barbaglia's vigilance. The mixture containing the white precipitate is shaken up in a test-tube with absolute ether in excess. Part of the precipitate dissolves and the liquid divides into three layers. The top layer is ethereal, the middle layer contains a number of flocks, and the lowest is aqueous. The ethereal solution when evaporated yields pure white crystalline buxine, the aqueous solution contains impure buxine, and the red flocks are parabuxine.

The author claims to be the first to have obtained pure crystalline buxine, the so-called buxine obtained by Fauré and others being a mixture of alkaloidal and glucosidal principles in proportion varying according to the source from which the substance was extracted, whether from the bark or leaves. Fauré and his successors all admit the existence of what they took to be a resin, in the alkaloidal mixture obtained by them, which could not be separated even by nitric acid, as recommended by Mayr. This supposed resin does not exist; what was taken for a resin is really the principle which the author has called parabuxine provisionally. This body is different in its physical and chemical characters to the parabuxine of Pavia, which was a mixture of buxine and true parabuxine.

The author concludes by remarking that now we have an easy method of obtaining buxine in a reasonable state of purity, the investigations of its value as a febrifuge may be carried on with more certainty than those made with Pavia's buxine, the efficacy of which as a substitute for quinine as an antiperiodic has been so often contested. The true chemical formula of buxine can now be established, and the question of its identity with bibirine, asserted by Walz and confirmed by Flückiger, who also states that it is identical with pareirine and paricine, definitively determined.*

The author promises to give us another paper detailing his researches into the chemical properties of a number of buxine salts and substitution compounds.

HOW BEESWAX IS MADE.†

BY W. Z. HUTCHINSON.

I presume that the majority of people who are not bee-keepers suppose that bees gather wax from some source, in the same way that they gather honey, pollen, and propolis. I once heard even a bee-keeper remark: "We had a nice spring day yesterday. My bees had a splendid 'fly,' and I noticed that some of them came in loaded with pollen and wax." That bees do not gather wax is easily proved by confining them in an empty hive or box, and feeding them on honey or a syrup made of sugar, when they will immediately commence the construction of combs. During the working season wax is secreted by the bees, and forms in thin white scales, or flakes, between the rings, or segments, of the abdomen. Such renowned scientists as Professors Agassiz and Tyndall have made some very amusing blunders (blunders which showed they had never seen bees building comb) in attempting to tell how honeycomb is built. The exact manner in which these little pellets of wax are formed into beautiful

* See *Pharm. Journ.*, [2], xi., 192.

† From the *Country Gentleman*. Reprinted from the *Oil and Drug News*, May 16, 1882.

white combs is well described in the 'A B C of Bee Culture':—

"If we examine the bees closely during the season of comb building and honey gathering, we shall find many of them with the wax scales protruding between the rings that form the body, and these scales are either picked from their bodies, or from the bottom of the hive or honey boxes in which they are building. If a bee is obliged to carry one of these wax scales only a short distance, he takes it in his mandibles, and looks as business-like with it thus as a carpenter with a board on his shoulder. If he has to carry it from the bottom of the honey box, he takes it in a way that I cannot explain any better than to say he slips it under his chin. When thus equipped, you would never know he was incumbered with anything, unless it chanced to slip out, when he will very dexterously tuck it back with one of his fore feet. The little plate of wax is so warm from being kept under his chin as to be quite soft when he gets back; and as he takes it out, and gives it a pinch against the comb where the building is going on, one would think he might stop awhile and put it into place; but not he, for off he scampers and twists around so many different ways, you might think he was not one of the working kind at all. Another follows him sooner or later, and gives the wax a pinch, or a little scraping and burnishing with his polishing mandibles, then another, and so on, and the sum total of all these manœuvres is that the comb seems almost to grow out of nothing; yet no bee ever makes a cell himself, and no comb building is ever done by any bee while standing in a cell. The finished comb is the result of the moving, restless mass, and the great mystery is that anything so wonderful can result at all from such a mixed-up, skipping-about way of working."

In every apiary should be a box or barrel in which to throw all waste comb, and the cappings that are shaved off the combs when extracting. When much transferring or extracting is done, considerable wax can in this manner be saved, and it is as easy to save it as it is to throw it away. During the hot weather these refuse combs and cappings should be melted up into wax quite often; otherwise they will become infested with the bee moth's larvæ, and thereby destroyed. There are several methods of melting up combs and cappings into wax, but I have tried none that is more simple, or better, than to make a bag out of some coarse sacking, fill it with pieces of comb, tie it up, and put it into a wash boiler. Set the boiler on the stove and fill it nearly full of water. When the water is almost hot enough to boil, take a stick and punch, poke and press the bag until the wax is all melted and risen to the top. Now lay a narrow strip of board across the top of the boiler, and tie it fast to the handles; then take two or three sticks that are nearly as long as the boiler is deep, press the bag down to the bottom of the boiler with these sticks, and keep it in this position by putting the upper end of the sticks under the strip of board that is fastened across the top of the boiler. Now set the boiler off the stove, and when its contents are cold, the wax can be taken off in one solid cake. In passing through the bag the wax is cleansed from all coarse impurities, while the fine particles of dirt that do escape will be found either upon the top or bottom of the cake of wax, from whence they can easily be removed.

When the combs and cappings have all been worked up, and the cakes of wax have been scraped free from all dirt or sediment, the cakes should all be put into the boiler, melted up together, and the wax run into neat cakes.

To clean utensils from beeswax, they should first be scraped with a knife as clean as possible, and then rubbed with a cloth saturated with kerosene oil. Beeswax is sometimes adulterated with paraffin, ceresin, or tallow. To detect these frauds, a piece of wax should be chewed; if adulterated, even slightly, with either, it will chew like gum, while if pure, it will crumble and break to pieces in the mouth, and will not make gum at all.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 10.)

Oleum Lini Sulphuratum (*Sulphurated Linseed Oil*).

Linseed oil	1
Washed sulphur	6

Mix and heat them together, in a porcelain capsule, at a temperature between 120° and 130° C. (248° to 266° F.), under constant stirring, until the sulphur is dissolved.

A dark-brown liquid, having a yellow colour in thin layers, and completely soluble in oil of turpentine.

Oleum Terebinthinæ Sulphuratum (*Sulphurated Oil of Turpentine*).

[Balsamum Sulphuris Terbinthinatum. Haarlem Oil.]

Sulphurated linseed oil	1
Rectified oil of turpentine	2

Mix and filter.

The product is a bright, red-brown oily liquid.

Ferrum Dialysatum in Lamellis (*Dialysed Iron in Scales*).

Solution of dialysed iron	q.s.

Evaporate it to a syrupy consistence at a temperature of 40° to 60° C. (104 to 140° F.). Spread it upon glass and dry it by exposure to the air.

Red-brown scales, generally not entirely soluble in water, and containing 75 per cent of iron.

Pasta Escharotica (Canquoin's (*Canquoin's Caustic*)

	No. 1	2	3	4.
Chloride of zinc, parts	1	1	1	1
Wheat starch or linseed meal, parts	2	3	4	5

Mix them to a paste by means of water, roll it out, form it into suitable pieces, and deliver them in well-closed bottles.

The paste should be freshly made when wanted for use.

Pepsinum (*Pepsin*).

Pepsin may be prepared from pigs' stomachs by washing the mucous coat, chopping it fine, and macerating it for two days with water acidulated with hydrochloric acid, or with a mixture of water and glycerin. The pepsin is precipitated from the solution either by a saturated solution of chloride of sodium or by alcohol; and precipitated pepsin is dried in a vacuum at a temperature below 40° C. (104° F.).

Pure pepsin is a brownish-yellow, amorphous, very hygroscopic mass, soluble in water and dilute acids. These solutions do not coagulate on boiling, and are scarcely precipitated by acetate of lead and chloride of platinum.

Commercial pepsin varies considerably in colour and hygroscopic property, according as it is mixed with different substances, as milk, sugar, etc. In general, good pepsin should respond to the following tests:—

Dissolve 0·1 gm. of pepsin in 100 gm. of distilled water, and 2 gm. of hydrochloric acid; then add 10 gm. of white of egg, coagulated at a temperature of 95° C. (203° F.). Let the mixture stand for forty-eight hours, occasionally shaking it, at a temperature of about 40° C. (104° F.). The white of egg should thereby be completely dissolved or the undissolved portion should not amount to more than 0·5 gm.

The more rapidly the white of egg is dissolved and the smaller a precipitate is produced in the solution by nitric acid, the better is the pepsin.

Quiniæ Carbolas (*Carbolate of Quinine*).

[Quiniæ Phenylas.]

Carbolic acid	6
Quinine (alkaloid)	10
Alcohol (0·820)	30

Dissolve the carbolic acid in the alcohol, warm the

* From *New Remedies*, April, 1882.

solution, add to it the quinine, then filter, and evaporate the filtrate to dryness upon the water-bath.

The product is a white powder, soluble in 400 parts of water and in 80 parts of alcohol. It is rendered violet by solution of ferric chloride.

ZINCI PHOSPHIDUM (*Phosphide of Zinc*).

Phosphide of zinc occurs either in brittle lumps, having more or less a metallic lustre, or in form of a grey, metallic, fine powder, having an odour of phosphorus, permanent in the air, and of the specific gravity 4·7. When heated out of contact with air, it is completely volatilized; with access of air, it is converted into phosphate of zinc. Acids decompose it, setting free phosphoretted hydrogen, and forming the corresponding zinc salts. Alkalies leave it unaltered.

When examined by a lens, the salt should not show the presence of unaltered metallic zinc. *One* part of the finely-ground powder, covered with a solution of chloride of ammonium, and digested for one day, should yield a precipitate which, when collected on a filter and washed successively with water, strong alcohol, and ether, and dried in the air, should weigh at least 0·9 parts.

PHOSPHORUS PULVERATUS (*Powdered Phosphorus*).

Phosphorus, cut in pieces	q.s.

Drop the phosphorus into a flask half filled with a solution of chloride of sodium. Warm the mixture until the phosphorus melts. Then shake it until the liquid becomes cold. Pour off the solution of the salt and wash the powdered phosphorus thoroughly with water.

It should be preserved under water.

POMATUM DUPUYTREN (*Dupuytren's Pomade*).

Extract of cinchona fusca (cold prepared)	12
Lemon juice	6
Tincture of cantharides	6
Beef-tallow, fresh	96
Oil of bergamot	1

Dissolve the extract of cinchona in the lemon juice and tincture of cantharides, and add the other ingredients.

PULVIS CINCHONÆ SUCCIRUBRÆ (JAVANICÆ SEU INDICÆ). (*Powdered Red Cinchona* (*Javanese or East Indian*).)

The powder of any cultivated red cinchona bark, yielding at least 6 per cent. of total alkaloids. The quantity of the latter is to be ascertainded by the following process of assay:—

	Grams.
Bark of the stem of Javanese or East Indian red bark, in fine powder	10
Normal hydrochloric acid	10
Oxalate of potassium	0·15
Solution of soda (10 per cent.)	q.s.
Distilled water	q.s.
Acetic acid	q.s.

Macerate the powder with 30 gm. of distilled water and 10 gm. of normal hydrochloric acid during twelve hours, frequently stirring. When the froth is settled, transfer the mixture to a percolator, the lower orifice of which is closed by a linen pellet (or other contrivance), and percolate with distilled water, until a few drops of the liquid passing through are no longer rendered cloudy by solution of soda.

Mix the liquid carefully with dilute solution of soda until a slight cloudiness makes its appearance; then add just enough dilute acetic acid to cause the cloudiness to again disappear. Heat the clear liquid to near the boiling point, and add to it the oxalate of potassium dissolved in water. Filter off the resulting precipitate, wash it, and add to the filtrate an excess of soda solution.

Collect the resulting precipitate upon a double filter, wash it, first with dilute soda solution and afterwards with distilled water, until the washings are almost colourless. Dry the precipitate by exposure to air until it can be easily detached from the filter; then transfer it to a tared capsule, and dry it on the water-bath.

The weight of the precipitate multiplied by 0·041 gm. for every 100 cubic centimetres of mother-liquid and wash-water, indicates the quantity of total alkaloids in the 10 gm. of the powder.

N.B.—Normal hydrochloric acid is standardized upon normal solution of soda and this is standardized upon normal solution of oxalic acid.

Normal oxalic acid contains 63 gm. of the pure acid in 1000 c.c.

Normal soda solution contains 40 gm. of pure sodic hydrate in 1000 c.c.

Normal hydrochloric acid is made by mixing 120 gm. of hydrochloric acid (specific gravity 1·160) with about 750 cubic centimetres of distilled water, and trying how much normal soda solution is required to exactly neutralize 10 c.c. of this solution. From the figure obtained calculate the amount of distilled water which must be added so that it takes exactly 10 c.c. of the acid to neutralize 10 c.c. ol the alkaline solution.

FERRI SACCHARAS (*Saccharate of Iron*).

[Ferri Oxidum Saccharatum Solubile.]

Solution of chloride of iron (ferric) specific gravity 1·480	2
Syrup	2
Solution of soda (specific gravity 1·33), a sufficient quantity, or about	3
Sugar	q.s.
Distilled water	q.s.

Mix the syrup with the solution of chloride of iron, and drop the mixture, while stirring, into so much solution of soda that the precipitate first formed is redissolved. Let the mixture stand for twenty-four hours; then pour the clear liquid into 30 parts of boiling distilled water, and let it deposit, after stirring it up.

Pour off the clear liquid from the precipitate, collect this upon a filter, and wash it with warm distilled water as long as it runs off colourless and has an alkaline reaction. Then let the precipitate drain, transfer it to a capsule, mix it with 9 parts of sugar, and dry the mixture, while stirring, on the water-bath, and finally add enough sugar to make the whole product weigh 10 parts.

Saccharate of iron is a brown-red powder, having a sweet, faintly metallic taste, and, when mixed with 5 parts of water, dissolving to faintly alkaline liquid. The reaction for iron compounds is not developed in this liquid until it has been acidulated by hydrochloric acid.

It contains 3 per cent. of iron, and should be preserved in well-closed vials.

SAL CARLSBADENSE FACTITIUM (*Artificial Carlsbad Salt*).

Sulphate of sodium, dried and powdered	46
Bicarbonate of sodium, powdered	42
Chloride of sodium, powdered	20
Sulphate of potassium, powdered	3

Mix and keep in a well-stoppered bottle.

QUINIÆ SALICYLAS (*Salicylate of Quinine*).

Hydrochlorate of quinine	15
Salicylate of sodium	6
Distilled water	q.s.

Dissolve the hydrochlorate of quinine in 600 parts of boiling distilled water, and add to it a solution of the salicylate of sodium in 20 parts of distilled water. Collect the precipitate, after cooling, on a filter, wash it until the washings are no longer rendered turbid by nitrate of silver, and dry it with a gentle heat.

The salt may be obtained in crystals by dissolving it in strong alcohol and concentrating.

When crystallized from alcohol, the salt appears in silky needles; when obtained as a precipitate, it is a white, amorphous powder, soluble in about 900 parts of cold water and in 20 parts of strong alcohol.

The aqueous solution has a fluorescence, which increases very much by adding dilute sulphuric acid. Addition of solution of ferric chloride renders the solution dark violet.

(*To be continued*).

The Pharmaceutical Journal.

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Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

A MEDICAL VIEW OF THE LEGITIMATE RELATIONS BETWEEN MEDICINE AND PHARMACY.

Now that attention is being largely directed to the achievement of reforms in regard to the practice of medicine and of pharmacy, as well as to improvement of the systems of education by which students are trained for either career, it is with special interest that we have read a letter in a late number of the *Lancet*, in which the proper lines of distinction between the practice of medicine and the practice of pharmacy are sketched out by a writer who signs himself an M.D. of the University of Edinburgh. At the present time the improvement of the social status of medical practitioners is acknowledged to be a desideratum, and it is also acknowledged that the means by which such a result is most likely to be attained is suitable modification of the educational system. Precisely the same requirements are recognized in regard to those engaged in the practice of pharmacy, but it has not been sufficiently taken into consideration that for the success of either project it is necessary to bestow some care upon the regulation of medical and pharmaceutical practice, so as to do away with, or at least to diminish that confusion of the one with the other which is almost peculiar to this country and has been a source of much embarrassment.

It is to this point that the letter we have referred to is directed, and we are glad to take the opportunity of placing before our readers the views of a medical man upon the subject, feeling sure that they will in many respects meet with hearty concurrence from them as they do from ourselves. It is, in the opinion of our contemporary's correspondent, high time that some serious inquiry was made whether or no any laborious education and high-class degree are likely to reconcile the owners of such with their position as *confrères* of the majority of their profession who are at present engaged in the compounding and sale of drugs. According to his view of the case the time has arrived when the necessity for medical men dispensing their own drugs no longer exists, and in seeking to ascertain the causes for the maintenance of such a "miserable practice," he comes to the conclusion that the first and foremost of them is the fact that our English students look, as a rule, to the possession of a qualification to be obtained from a trading company as their highest ambition in medicine. Another reason that he assigns for the continuance of the practice of dispensing by medical men is the fact that those who carry it on are "catering for popularity by the sale of cheap physic." As regards those who cannot otherwise keep their patients, however, it is maintained that they have mistaken their vocation; they would have done better to take to trade, and they surely pay themselves but a poor compliment when they acknowledge that without their cheap physic their services would be in no request.

With this expression of opinion from a medical practitioner's point of view there will be, we are confident, a very general concurrence on the part of those engaged in the practice of pharmacy and from their point of view the separation of medical from pharmaceutical practice will be regarded as one of the most essential conditions for the advancement of pharmacy. In this respect there is a perfect harmony between pharmacists and the views enunciated by the Edinburgh physician. But it is very frequently asserted that there is some difficulty in the way of medical practitioners giving up the preparation of their medicine and on this point, therefore, it is desirable to hear what is said by the authority we have quoted. As a traveller over the greater part of the world he speaks from his own experience of the position that medical men occupy in different countries, and his conclusion is that nowhere is the social position higher than it is in Edinburgh. But in that city he adds that out of the very great number of medical men residing in it no such thing is known as a man sending out his own medicine. In regard to the alleged necessity for medical men dispensing their own drugs in some places, it is urged that this arises only from the fact that in such places there is an apothecary wishing to be considered a medical practitioner, but not too proud to cater for popularity by the sale of cheap physic; if the apothecary ceased to undersell the legitimate tradesman, a chemist and druggist would soon appear upon the scene for the supply of what was needed.

In thus tracing back some of the worst grievances of the pharmacists of modern times to the apothecaries of a past age the writer of this letter has taken the same view of the matter that we have frequently expressed in this Journal, not only in regard to medical dispensing, but also in regard to counter prescribing, and it is by the removal of those prejudicial legacies of their predecessors that the pharmacists of the present must seek to establish a more natural and mutually advantageous relation between themselves and medical men. But while expressing our satisfaction at finding an admission on the part of a medical man that dispensing is properly the business of the

pharmacist, and that to him should be left everything that has to do with the preparation of medicine, we cannot but regret the evidently contemptuous feeling with which the writer of the letter referred to regards the pharmacist as compared with a member of the class to which he belongs himself. It may be that this state of mind is one of the consequences of that inharmonious relation between medical and pharmaceutical practitioners which is to a great extent prevalent in this country as well as peculiar to it. Therefore it is not surprising to find the pharmacist spoken of as a mere tradesman having no right to look for more than an ordinary trade profit any more than a grocer. But as this view of the position of the pharmacist in relation to the medical practitioner is not one common in other countries it might have been expected that the travelling experiences of the Edinburgh physician who writes in the *Lancet* would have enabled him to form a more liberal estimate of the pharmacist's claim to recognition as something different from a "petty tradesman." In this respect, however, much has to be learnt and to be established on both sides before we can congratulate ourselves upon the existence of such relations of mutual respect and intelligent recognition as are to be found in various other countries regulating the conduct of medical men and pharmacists towards each other.

THE PHARMACOPŒIA COMMITTEE OF THE MEDICAL COUNCIL.

At the late meeting of the Medical Council a Report was presented by the Pharmacopœia Committee. On a previous occasion the Council had passed a resolution to the effect that the Pharmacopœia Committee should report to the Council, year by year, as to addenda, and in the Report now presented it is stated that after due inquiry the Committee has not obtained sufficient information to enable it to report in accordance with the terms of that resolution. The Report further states that the present stock of the last edition of the Pharmacopœia amounts to 2550 copies, and that the average sale is about 1000 copies, from which data it is assumed that a fair estimate may be formed as to the period at which it will become necessary to supply a new edition. With a view to providing for the publication of such a future edition of the Pharmacopœia, the Committee recommends that the Pharmacopœia Committee be a Standing Committee until the issue of the work, and further that the Committee be authorized to appoint from amongst its own members a Sub-Committee, assigning to it such duties as may be thought fit, and to take such other steps as may be necessary for fulfilling the duties appertaining to the work; also that a sum not exceeding £100 per annum should be placed at the disposal of the Committee. The adoption of this Report was moved by Dr. Pitman and seconded by Dr. A. Smith, and agreed to. In reply to a request by Dr. Storrar for detailed information as to what the Committee proposed to do, Dr. Quain said it was proposed that the Sub-Committee should appoint editors, who would draw up a report to be submitted to the Council, pointing out what should be done with regard to the Pharmacopœia. Until such reports came before the Council no steps could be taken towards issuing the new edition of the work. Mr. Senior expressed a hope that at least one of the editors would be a person well acquainted with pharmacology abroad.

PERSONATION AT EXAMINATIONS.

At one of the sittings of the Medical Council last week, the subject of the possibility of personation at examinations was brought forward by Mr. Macnamara, who mentioned that some time ago it came to the knowledge of the Branch Council of Ireland that a sum of two hundred pounds had been offered to a practitioner by a student to pass some of the examinations for him that he might obtain registration. About the same time also information had reached the College of Surgeons that a certain student, whose name had figured at the top of the preliminary examination list, had been absent from Ireland at the time of the examination in which he had been supposed to have thus distinguished himself. Mr. Macnamara further spoke of a "successful grinder" who kept a student for the purpose of passing preliminary examinations, and adduced the deficiency in general education manifested in later examinations in support of his opinion that so long as the present plan of conducting the examinations was followed there would be no security against such personations. This view was to some extent adopted by Dr. Haughton and Mr. Teale, the latter saying that the deficiency in spelling and in Latin exhibited by many candidates was shocking. Eventually a resolution was passed to the effect that it is desirable that the Medical Council should know what provisions, if any, are taken to ensure the impossibility of personation at the examinations of the several bodies, the certificates of which are accepted by it as evidence of preliminary examination, and that the Executive Committee should be requested to inquire into and report upon the subject.

FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The eleventh meeting of the French Association for the Advancement of Science is to be held in La Rochelle, where it will commence on the 24th of August and terminate on the 31st. Persons wishing to read papers before the Congress should communicate either with Dr. Gariel, Secretary to the Council, 4, Rue Antoine-Dubois, Paris, or to M. Caillot, General Secretary to the Local Committee, La Rochelle.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 5, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Andrews, Borland, Bottle, Butt, Gostling, Greenish, Hampson, W. Hills, Radley, Robbins, Savage, Schacht, P. W. Squire, Symes, Williams and Young.

The minutes of the previous meeting were read and confirmed.

Inaugural Address.

The President announced that Mr. Joseph Ince had consented to deliver the inaugural address to the students in October next, in accordance with the unanimous request of the Council.

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

Shephard, William Arthur.
Short, Frederick William.

Elections.

MEMBER.

Pharmaceutical Chemist.

Frederick William Short, having passed the Major Examination and tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Darch, Alfred .....London.
Warburton, Walter .....Swinton.

Modified.

Nutt, Archbell James .....London.

ASSOCIATES.

The following, having passed their respective examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Bird, Frederick Charles John...Bath.
Coates, Udolphus Aylmer .....Walsall.
Dangerfield, William Henry ...Devizes.
Hall, John Thomas .....Manchester.
Hill, Arthur .....Leicester.
Lowther, Thomas William .....Cardigan.
Mills, Anne Emily .....Herne Hill.
Spencer, George .....Hitchin.
Wilkins, Edward .....Reading.
Wilcocks, Arthur Squire.....Portsea.

Modified.

Twiss, William .....Hunstanton.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Ayre, Harry .....Darlington.
Cullwick, Herbert Ernest .....Knighton.
Oram, Frank.....Totnes.
Pattison, Sydney .....London.
Reynolds, Richard Freshfield...Leeds.
Surman, Thomas William .....Bristol.
Taggart, Robert .....Glasgow.
Williams, John Owen .....Anglesey.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restoration to the Register.

The names of the following persons, who had made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

David Davies, 44, Regent Street, Liverpool.
Joshua Hughes, Abercarn, Monmouthshire.

Appointment of Professors.

Professor Redwood was reappointed Professor of Chemistry and Pharmacy for the ensuing year.

Professor Bentley was reappointed Professor of Botany and Materia Medica for the ensuing year.

Professor Attfield was reappointed Professor of Practical Chemistry for the ensuing year.

The Council Examination Prizes.

On the motion of the President, seconded by the Vice-President, Mr. Gibson (Leven) and Dr. W. Inglis Clark (Edinburgh) were appointed to conduct the examinations in the present month, for the Council examination prizes.

Reports of Committees.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to a former associate in business.

£10 to a registered chemist and druggist, aged 63.

£5 to a registered chemist and druggist, who has had two previous grants of £10 each.

£5 towards the support of an orphan who was unsuccessful at a recent election to an orphan asylum, the Secretary not having expended the money voted for the purpose, as he did not think it would ensure the election.

One other application had been deferred for further consideration.

The report and recommendations were received and adopted.

The Secretary announced that Mr. Thomas Buck, of Stamford Hill, had given a further donation of five guineas to the Benevolent Fund, making a total of one hundred and five guineas (£110 5*s.*)

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Librarian's Report.

The report of the Librarian had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day	344	22	7	13
	Evening	131	14	2	6

Circulation of books.	No. of Entries. Town.	Country.	Total.
May	175	169	344

Carriage paid, £2 8*s.* 0½*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Attfield (Professor), Pamphlet on the Relation to each other of Education and Examination, especially with regard to Pharmacy in Great Britain, 2nd ed., 1882. 2 *copies.* From the Author.

Squire's Companion to the British Pharmacopœia, 13th ed., 1882. 2 *copies.* From Mr. P. Wyatt Squire.

Thorowgood (J. C.), Student's Guide to Materia Medica and Therapeutics, in accordance with the British Pharmacopœia, 2nd ed., 1882. From the Author.

Pharmacopœia of the United States of America, 1820.

Pharmacopœia of the Massachusetts Medical Society, 1808.

Bigelow (J.), Treatise on the Materia Medica, 1822.

Thacher (J.), American New Dispensatory, 2nd ed., [1813]. From Dr. B. F. Davenport.

Constable (H. S.), Our Medicine Men.

Constable (H. S.), Fashions of the day in Medicine and Science, 1879. From Mr. W. Young.

Méhu (C.), Nouvelle méthode d'extraction de la matière grasse des urines dites chyleuses, 1882. From the Author.

The Committee recommended the purchase of the undermentioned works:—

Babington (C. C.), Manual of British Botany, 8th ed., 1881.

Jackson (B. D.), Literature of Vegetable Technology, 1882.

Kilner (W. B.), Compendium of Modern Pharmacy and Druggists' Formulary, 2nd ed., 1881.

Linnean Society of London, Transactions.

Oldberg (O.), Unofficial Pharmacopœia, 1881.

Pharmacopœia of the London Hospital, 1882.

Whitla (W.), Elements of Pharmacy, Materia Medica and Therapeutics, 1882.

The Committee also recommended that the Library and Museum be closed in the evening during August, and entirely for repairs during September.

Curator's Report.

The Curator had reported the average attendance in the Museum to have been—

		Total.	Highest.	Lowest.	Average.
May	Morning	258	25	3	11
	Evening	76	9	0	4

The following donations to the Museum had been received and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

African "Quina" Bark. From Messrs. Evans, Lescher and Webb.

Crystals of Ammonio-Chloride of Iron. From Dr. Prosser James.

Herbarium Specimens of Balsamodendron Roxburghii, Artemisia Sieversiana, and Origanum Majorana, used by the Portuguese in India; Root of *Gloriosa superba*; Fruit of *Randia uliginosa*. From Dr. Dymock, of Bombay.

Fresh Bael Fruits. From Mr. P. W. Squire.

Leaves of the Deer Tongue (*Liatris odoratissima*); *Euphorbia pilulifera*, and tincture of the herb. From Messrs. Burgoyne, Burbidges, Cyriax and Farries.

The Curator had submitted estimates for printing the Catalogue of the Hanbury Collection in the Museum of the Society.

Application for specimens from the Museum for scientific investigations had been received from Professor Bayley Balfour and Mr. W. H. Symons, also an application for a few specimens for a local museum at Bolton, through Mr. Woolley. The requests had been acceded to.

The Professors had attended the Committee and reported satisfactorily of their respective classes.

The list of Local Secretaries had been revised.

The details of painting and cleaning to be done during the recess had been considered, and an estimate for a new Council table had been obtained.

The Council went into committee to consider the details of the proposed alterations in ventilation of the Council room, etc.

On resuming, the report and recommendations of the Committee were received and adopted.

Deputation to the Privy Council.

The Council then went into committee for the purpose of enabling the President to state in detail what had passed on the previous day between a deputation of the Council, consisting of the President, Vice-President, Messrs. Bottle, Greenish, Hampson, Schacht and Williams, and the Lords of the Privy Council on the subject of the sale of poisons.

Local Secretaries.

The following list of Local Secretaries, submitted by the Library, Museum and Laboratory Committee, which had been further revised by the President and Secretary, was submitted:—

List of Local Secretaries, 1882–83.*

Towns eligible.	Names of persons appointed.
Aberdare	Thomas, Watkin, J.
Aberdeen	Davidson, Charles.
Abergele	Hannah, John.
Aberystwith	Wynne, Edwin Price.
Abingdon	Smith, William.
Accrington	Sprake, David Lewis.
Altrincham	Hughes, Edward.
Andover	Gould, Robert George.
Ashbourne	Reckless, Arthur Henry.
Ashton-under-Lyne	Bostock, William.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Ellis, Bartlett.
Bangor	Baker, Henry Villars.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Bath	Commans, Robert Dyer.
Beaumaris	
Bedford	Anthony, John Lilley.
Belper	Calvert, James.
Berwick	Carr, Walter Paterson.
Bewdley	
Birkenhead	Nicholson, Henry.
Birmingham	Southall, William.
Bishop Auckland	Dobinson, Thomas.
Blackburn	Farnworth, William.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, Francis.
Boston	Fowler, Wm. Ratcliffe.
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, Felix M.
Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner.
Bridlington	Jackson, Henry John.
Bridport	Beach, James.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Buckingham	
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Bury	Bowker, Ellis.
Bury St. Edmunds	Summers, Frank.
Buxton	Thresh, John Clough.
Calne	
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Hollway, Albert Brown.
Cardigan	Jones, John Edward.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes Cheney.
Chelmsford	Baker, Charles Patrick.
Cheltenham	Smith, Nathaniel.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Christchurch	Green, John.
Cirencester	Mason, Joseph Wright.
Clitheroe	
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Hinds, James.
Cricklade	
Croydon	Barritt, George.
Darlington	Robinson, James.

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

Towns eligible.	Names of persons appointed.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Goodall, Henry.
Devizes	Edwards, Thos. Roberts.
Devonport	Codd, Francis.
Dewsbury	Matterson, Edward H.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Dover	Bottle, Alexander.
Droitwich	Taylor, Edmund.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Eastbourne	Crook, Herbert.
Edinburgh	Stephenson, John B.
Elgin	Robertson, William.
Ely	Pate, Henry Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Delves, George.
Exmouth	Laugher, William.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Lanfestey, William G.
Flint	Jones, Michael.
Folkestone	Goodliffe, George.
Forfar	Ranken, James A.
Frome	
Gainsborough	Spouncer, Henry Thomas.
Gateshead	Elliott, Robert.
Glasgow	Kinninmont, Alexander.
Gloucester	Ward, Joseph.
Gosport	Hunter, John.
Grantham	Cox, John.
Gravesend	Bulgin, William.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, junior.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Bell, James Alfred.
Haverfordwest	Saunders, David Price.
Hawick	Craig, John.
Helston	Wakeham, Charles.
Hereford	Williams, Walter.
Hertford	Lines, George.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Horsham	Williams, Philip.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut. John, jun.
Kendal	Severs, Joseph.
Kidderminster	
Kilmarnock	Borland, John.
King's Lynn	Palmer, William Joseph.
Kingston-on-Thames	Walmsley, Samuel.
Kirkcaldy	Storrar, David.
Knaresborough	Potter, Charles.
Lancaster	Bagnall, Wm. Henry.
Launceston	White, Thomas.
Leamington	Davis, Henry.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liskeard	Young, Richard.
Liverpool	Symes, Charles.
Llandudno	Penney, William Sealy.
Longton	Prince, Arthur G.
Loughborough	Paget, John.
Louth	Hurst, John B.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Lyme Regis	Thornton, Edward.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidstone	Rowcroft, A. E.
Maldon	Wallworth, David.
Malmesbury	Brown, Francis James.
Malton	Buckle, James.
Malvern	Metcalfe, Edmund Henry.
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Marlborough	
Marlow	
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Midhurst	Cowap, Samuel Evan.
Monmouth	Key, Hobson.
Montgomery	
Montrose	Burrell, George.
Morpeth	Marshall, George T.
Neath	Hibbert, Walter.
Newark	March, William.
Newbury	
Newcastle-under-Lyme	Cartwright, William.
Newcastle-on-Tyne	Martin, Nicholas H.
Newport (I. of Wight)	Orchard, Herbert Joseph.
Newport (Mon.)	Seys, James Ancas.
New Radnor	
Newtown	Owen, Edward.
Northallerton	Warrior, William.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Fitzhugh, Richard.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Evans, John.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	Hatrick, William.
Pembroke	Treweeks, Rich. Harwood.
Penrith	Kirkbride, William.
Penzance	Cornish, Henry Robert.
Perth	
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Hearder, Henry P.
Pontefract	Bratley, William.
Poole	Penney, William.
Portsmouth, etc.	Childs, James L.
Preston	Barnes, Lawrence R.
Ramsgate	Morton, Henry.
Reading	Hayward, Wm. Griffith.
Redditch	Mousley, William.
Retford	Clater, Francis.
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Judson, Thomas.

Towns eligible.	Names of persons appointed.
Rochdale	Taylor, Edward.
Rochester	Harris, Henry William.
Rugby	Chamberlain, Arthur G.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur Edward.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, Samuel Ralph.
Sandwich	Baker, Frank.
Scarborough	Whitfield, John.
Seacombe	Walker, John Henry.
Selby	Cutting, Thomas John.
Shaftesbury	Barry, Frederic.
Sheerness	Bray, John.
Sheffield	Ward, William.
Shields, South	Mays, Robert J. J.
Shoreham	Fenner, Edwin.
Shrewsbury	Cross, William Gowen.
Slough	Griffith, Richard.
Southampton	Dawson, Oliver R.
Southport	Ashton, William.
Spalding	Shadford, Major.
Stafford	Averill, John.
Stalybridge	Brierley, Richard.
Stamford	
Stirling	Duncanson, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Bland, Thomas Frederick.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Blake, William F.
Sunderland	Harrison, John.
Swansea	Grose, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Gregory, George Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Tewkesbury	Allis, Francis.
Thirsk	
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Michelmore, Philip W.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	Stobbs, Robert.
Uttoxeter	Johnson, John Borwell.
Wakefield	Wice, Jonathan H.
Wallingford	Payne, Sidney.
Walsall	Bate, Joseph William.
Wareham	Randall, Thomas.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wenlock	Botwood, Charles W.
Westbury	Taylor, Stephen.
West Bromwich	Stamps, Frederic.
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Wigan	Phillips, Jonathan.
Wigton	
Wilton	
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wolverhampton	Brevitt, William Yates.
Woodbridge	Betts, John.
Woodstock	
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, James Fisher.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, Wm. Sheppard.
Yeovil	Maggs, Thomas Charles.
York	Davison, Ralph.

Mr. Young raised the question whether it was necessary to appoint a Local Secretary for Edinburgh.

The Council went into committee to discuss the matter. On resuming,

Mr. Young said he did not wish to divide the Council upon the question, and on the assurance of the President that the matter should be further considered before the appointments were made next year, the list as submitted was unanimously approved.

Local Examinations.

The Secretary presented the following table showing the attendance of candidates at the various centres for the last eleven examinations:—

PRELIMINARY EXAMINATION.

List of Centres and Table of Attendances of Candidates at each Centre.

	1880. Jan., Apr., July, Oct.	1881. Jan., Apl., July, Oct.	1882. Jan.	1882. Apr.	1882. July.	Total number of attendances at each centre at 11 examinations.
ENGLAND AND WALES						
Birmingham	72	62	15	17	15	181
Brighton	9	11	3	6	6	35
Bristol	41	38	9	10	9	107
Cambridge	14	18	7	8	3	50
Canterbury	19	19	2	4	2	46
Cardiff	23	29	8	5	10	75
Carlisle	26	27	8	5	9	75
Carmarthen	20	33	12	11	11	87
Carnarvon	25	15	5	6	6	57
Cheltenham	9	6	2	2	4	23
Darlington	22	23	1	5	5	56
Exeter	32	25	10	9	6	82
Hull	26	23	8	5	10	72
Lancaster	29	14	7	5	8	63
Leeds	53	57	13	13	24	160
Lincoln	35	29	10	7	7	88
Liverpool	50	44	6	9	10	119
London	170	147	36	47	54	454
Manchester	89	76	27	24	31	247
Newcastle	43	31	10	16	9	109
Northampton	17	17	2	6	4	46
Norwich	39	23	5	8	8	83
Nottingham	50	37	0	14	10	111
Oxford	9	7	2	3	2	23
Peterborough	15	15	10	5	5	50
Sheffield	24	24	5	8	8	69
Shrewsbury	20	25	4	2	7	58
Southampton	21	27	9	7	9	73
Truro	9	20	6	10	3	48
Worcester	9	11	4	3	2	29
York	25	34	6	12	9	86
SCOTLAND.						
Aberdeen	40	43	14	12	17	126
Dundee	23	33	7	10	9	82
Edinburgh	73	88	15	21	22	219
Glasgow	32	39	11	6	10	98
Inverness	10	12	3	1	1	27
Douglas, I. of Man	—	—	1	—	2	3
Guernsey	2	3	1	1	3	10
Jersey	2	1	—	—	—	3

It was resolved that Superintendents be appointed at the above-mentioned centres, and that the appointments be offered in the first instance to the Local Secretaries in the respective places, with the exception of London.

REPORTS OF COMMITTEES—*continued.*

LAW AND PARLIAMENTARY.

The report of this Committee dealt with a communication from the Colonial Office, relating to an ordinance to regulate the dispensing and sale of drugs and poisons in St. Lucia, and stated that the following letter had been sent in reply:—

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.,
"*June* 22*nd*, 1882.

"Robert G. W. Herbert, Esq.,
"Colonial Office,
"Downing Street, S.W.

"Sir,—I have the honour to communicate, for the information of the Secretary of State for the Colonies, the following observations which the Council of this Society offers upon a copy of an Ordinance of the Legisture of St. Lucia, entitled 'An Act to Regulate the Sale of Drugs and Poisons in this Colony,' transmitted by you for that purpose under date 20th of May last.

"Section 6 appears to assume that the law relating to apothecaries and chemists and druggists in the United Kingdom of Great Britain and Ireland is uniform, whereas the contrary is the case (38 and 39 Victoria, cap. 57, relates exclusively to Ireland).

"It may prove in the course of the administration of this section that inconvenience will not arise upon the language used, but in fact verbal accuracy would be promoted by insertion of the words 'or a pharmaceutical chemist,' after 'apothecary,' and before 'or a chemist and druggist,' and of the words 'in any part of' immediately before 'the United Kingdom of Great Britain and Ireland.'

"Section 7, sub-section 1.—The exemption of homœopathic medicines is the first instance known to the Council of special exemptions in favour of such medicines. However harmless so-called 'homœopathic medicines' may for a time have been, it is now not open to doubt that potent and dangerous poisons are sold as 'homœopathic medicines,' and it is deemed probable that wherever an exemption, such as is contemplated by the sub-section, may prevail, the exemption will become used so as to practically evade and defeat the general law.

"Section 7, sub-section 1, and section 8.—And it may be added that retailers of 'homœopathic medicines' so-called, are not, as a rule persons holding qualifications.

"Section 7, sub-section 1, and section 8.—Observations made by the letters which in 1881, under dates June 9th and 20th, I had the honour to address to Mr. Wingfield, for the information of the Secretary of State for the Colonies, on the Sale of Drugs and Poisons Law (Jamaica), apply to these sections. (See heading sections 18 and 19 of the letter of 9th June.)

"Section 10.—This appears to have been framed upon provisions contained in the Apothecaries Act, of 1815, which provisions soon became and now are practically obsolete.

"The official copy of the ordinance you sent me is returned herewith.

"I have the honour to be, Sir,
"Your obedient servant,
"RICHARD BREMRIDGE.
"*Assistant Secretary.*"

The report also included the following correspondence with the Privy Council respecting the proposed addition of sulphuric and other acids to the Poison Schedule:—

"Privy Council Office,
"Whitehall,
"9 *June*, 1882.

"Sir,—I am directed by the Lords of the Council to transmit to you the enclosed copy of a letter which has been received from Messrs. Dale and Plant giving reasons why sulphuric and other acids should not be added to the list of poisons under the Pharmacy Act, 1868, and I am to state that their Lordships would be glad to receive any remarks that the Pharmaceutical Society might desire to offer in reply to the objections raised by Messrs. Dale and Plant.

"I am, Sir,
"Your obedient servant,
(Signed) "C. L. PEEL.

"The Secretary,
"Pharmaceutical Society,
"17, Bloomsbury Square, W.C."

"*Copy.*
"(44688).
"81, Smallbrook Street,
"Birmingham,
"31*st May*, 1882.

"Dear Sir,—In reply to your kind memorandum of the 18th inst., No. 44599, respecting the addition of sulphuric and other acids to the Pharmacy Act:—

"1. Firstly, we believe it would be injurious to freedom of trade in creating monopoly, especially in manufacturing towns, where it is largely used.

"2. Secondly, it would enhance prices considerably, as chemists do not lay themselves open, at present, for this branch of trade, therefore, would require special hands for supplying these articles.

"3. Thirdly, we believe that chemists, as a whole, would not care for this trade being added, as it is extremely cumbersome, heavy, dirty, and very liable to accident. It would, no doubt, interfere with their dispensing department, on account of the dirty bottles in which it is usually supplied to consumers.

"4. Fourthly, it would be very inconvenient to manufacturers, as a whole, to be compelled to send to certain places for a supply, instead of getting it near at hand.

"5. Fifthly, we do not see how any public good can accrue from any fresh restrictions, as it is rarely, if ever, used as a poison.

"6. Sixthly, it would very largely affect a large number of old-established drysalters, who have cultivated a manufacturing trade in these goods, and do not dispense medicines; therefore, we think they should receive an amount of consideration before destroying their trade.

"If you should deem it necessary, we shall be pleased to forward you a memorial from the trades interested in the matter.

"Thanking you for your courtesy, and hoping to receive a favourable reply.

"We are, Sir,
"Yours obediently,
(Signed) "DALE AND PLANT

"The President,
"Privy Council,
"London."

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.,
"*June* 22*nd*, 1882.

"C. L. Peel, Esq.,
"Privy Council Office.
"Whitehall, S.W.

"Sir,—I am directed to send for the information of the Lords of the Council the following observations on a letter received by their Lordships from Messrs. Dale and Plant, in reference to the proposed addition of sulphuric and other acids to the poison schedule of the Pharmacy Act.

"Messrs. Dale and Plant assume that if these acids be

added to the schedule it would entail considerable inconvenience on manufacturers as purchasers, and dealers in heavy chemicals as sellers of these acids. They seem to be unaware that such dealings as are referred to would be of the nature of sales by *wholesale*, and as such would be exempted by Section XVI. from those provisions of the Act which require that the sale should be confined to registered persons. The only restriction imposed by the Act in the case of such wholesale dealings is that the vessel containing the scheduled poison shall be labelled with the name of the article and the word 'Poison.'

"This assumption renders it unnecessary to reply in detail to the points raised in Messrs. Dale and Plant's letter, except, perhaps, No. 5.

"As to this it is submitted that, though cases of poisoning resulting in death by these acids are not so numerous as by some other poisons, it is undeniable that many serious cases of accidental poisoning, inflicting much harm and damage to the health, do occur. Vitriol throwing, moreover, is not by any means an uncommon form of the misuse of sulphuric acid.

"I am further instructed to state that the Council of this Society, before resolving to recommend that these acids should be added to the schedule, made numerous inquiries throughout the country as to the probable effect of bringing these acids within the provisions of the Act, the result of which satisfied them that it would be conducive to the safety of the public to place some restrictions on the sale of them, and that it would be practicable to impose such restrictions without seriously interfering with trade or industrial manufactures.

"I have the honour to be, Sir,
"Yours obediently,
(Signed) "RICHARD BREMRIDGE,
"*Assistant Secretary.*"

The report was received and adopted.

GENERAL PURPOSES.

The report of this Committee was, as usual, read in committee. It included letters from the Solicitor, giving particulars of cases that had been placed in his hands for prosecution; also details of several cases of alleged infringement of the Pharmacy Act, some of which were recommended for prosecution.

The report and recommendations were received and adopted unanimously.

PHARMACEUTICAL EDUCATION.

The following letter from Professor Attfield including one from Dr. Carpenter, was read:—

"Ashlands, Watford,
July 4th, 1882.

"To the Council of the Pharmaceutical
"Society of Great Britain.

"Mr. President and Gentlemen,

"I hope I shall not incur a charge of excess of zeal, if I venture to lay before you some opinions that happen to have come before me in support of the principle you recently adopted respecting the future relationship of education and examination.

"Ever since I commenced the advocacy of a recognized compulsory curriculum in pharmacy, namely, ten years ago, in a paper read at the Conference at Brighton, I have frequently had to meet the objection that the Society's existing plan of examining all comers was also carried out at the London University, and that what was good enough for the latter was good enough for the former. The reply, of course, was that the University made an exception to the rule in the case of medical candidates, with whom pharmaceutical candidates might fairly be classed. That this contention was well founded is shown by the enclosed letter from Dr. Carpenter, than whom no one else is better acquainted with the aims and objects of the University. I have lately received equally satisfactory opinions from Sir Robert Kane, Professor Tyndall and other high authorities.

"Since the Council's adoption of the principle referred to, but prior to the last Annual Meeting, I have distributed to each of the three thousand six hundred Members and Associates in Business of the Society, copies of that Essay on the Relationship of Education and Examination which two years ago I sent to the Members of Council, Examiners, and other prominent pharmacists. Already upwards of three hundred letters, besides acknowledgments, have come to hand, *all but five* being in favour of the action taken by the Council.

"I apologize for having urged reform in this matter with a persistence which may at times have appeared obtrusive. I can only plead love for pharmacy and that the end has crowned the means.

"Yours faithfully,
"JOHN ATTFIELD."

"56, Regent's Park Road,
"London, N.W.
"*May* 7, 1882.

"Dear Professor Attfield,

"In my former official position as Registrar of the University of London, it was my duty to administer a great system of examination for degrees in arts, science, and laws, open to all comers, but devised, with the aid of the experience of able teachers, to defeat cram, as far as possible; and the proof of its efficiency has been given by the much greater success of really *educated* candidates, as compared with those who were merely trained for the examinations.

"It has often been urged that the medical degrees of the University should be opened, like those of the other Faculties, without any restriction as to the mode in which candidates for them should prepare themselves. But the Senate have firmly held (and I trust that they will ever continue to hold) to the principle, that as medical degrees attest the candidate's qualification to practise medicine, they stand upon a footing altogether different from degrees which simply attest the possession of certain intellectual attainments. And they consider it essential to the possession of that qualification, that the candidate should have been systematically educated for it, the use of examinations being to test the thoroughness of his education, and the degree in which he has profited by it.

"As pharmacy partakes in this respect of the character of medicine, I am entirely at one with you in the principle that candidates for a qualification to practise pharmacy should be required to go through an education suited to qualify them, rather than a training which may enable them to pass examinations; or, in other words, that the examination should be adapted to test the thoroughness of the education which the candidate has received, rather than that the education should be adapted to bring up those who receive it to a certain examination standard.

"Believe me,
"Yours very sincerely,
"WM. B. CARPENTER."

The PRESIDENT said it was very satisfactory that a man who had been at the helm of a great examining body like the London University should have stated so definitely that free trade in examinations was not the wisest policy to pursue where special qualifications were required. It was also remarkable that, concurrently with the writing of this letter and with Dr. Carpenter's resignation, a new university had come into existence, in which examinations were made secondary to training.

Mr. HAMPSON thought it was free trade in education rather than in examination which the President meant to refer to.

The PRESIDENT said that was so. Those who had had experience of graduates from various universities were aware that there was a vast difference in the result produced by a process which involved good training,

finishing up by an examination, as compared with simply an examination which might be passed at any time without the candidate being properly trained. In pharmacy they could never hope to go in for such a kind of training as was contemplated in the London University for degrees, but it was important that this letter should be placed on record.

Mr. Hampson said it was rather remarkable that these letters should have been sent just at this moment when Mr. Schacht was about to move his resolution with regard to examinations.

Mr. Schacht said he had no knowledge of these letters until he came into the room that day. At the same time he was very glad that Dr. Carpenter had been kind enough to write this letter, as, though it would not be likely to alter the views the members of Council themselves entertained, it might have some weight outside, inasmuch as Dr. Carpenter's opinion would carry great weight with the public mind.

After some further discussion, it was resolved to print the letters above given, providing the permission of the writers were obtained.

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

"That a Committee be appointed for the purpose of considering the best method of giving effect to the resolutions of the Council of April 5, upon the Report of the Special Committee appointed to inquire into the Relation to each other of Pharmaceutical Education and the Pharmaceutical Examinations, and of reporting thereon to the Council; together with any suggestions it may desire to advance as the result of its deliberations: and that the Committee consist of the President, the Vice-President, Messrs. Bottle, Greenish, Hampson, Hills, Schacht and Symes."

He said he should occupy but a very short time, seeing that it seemed to be the natural consequence of what was done on the 5th of April. Certain propositions were plainly approved and adopted, and as practical men their next step must be to see their way to carry out those conclusions. He would venture just to intimate that one of the first duties the Committee would have to do would be to inquire how far the present legislative power would enable the Council to carry out the resolutions which were adopted, and if it should appear that the Council had no power at all in the matter, of course the subject must be relegated to a future time when its power was increased. But if it should appear that existing powers would enable the Council to go a long way, if not the whole way, towards carrying out the desired results, then further steps could be taken. His own opinion was that the Council had power at present to carry out these resolutions which had been approved and adopted, and he hoped that it would be found on investigation that the Solicitor not only confirmed that view, but would amplify and enlarge his own idea of the scope of the Council's powers. That was a question entirely for consideration and inquiry. In the last sentence of the motion he had ventured to indicate that if in the course of the Committee's inquiries any further suggestions arose which it was thought ought to be presented to the Council for approval, it should have power so to do. In asking that he was simply asking for power to report to the Council; that the Committee should have within the scope of its duties to formulate any fresh ideas on this large subject which occurred to it, and present them to the Council. The motion was so simple that there was no occasion to enlarge further upon it.

Mr. Symes seconded the motion.

Mr. Robbins thought it must be left to the Solicitor to decide what power the Council possessed, and he thought the first thing the Committee should do would be to consult the Solicitor.

Mr. Greenish said the Committee would have full power to consult the Solicitor if necessary.

Mr. Hampson said he should ask Mr. Schacht to leave out the last part of the motion. A new Committee, appointed to give effect to the resolution of the Council, would naturally go into the details of the resolutions and the practical steps to be taken, and the latter part of the motion did not seem necessary unless Mr. Schacht was anxious to reopen the whole question and amplify his scheme. He did not want to enter into Mr. Schacht's inner consciousness, but that gentleman had made use of the expression that he wished the Committee to formulate fresh ideas, and it appeared to him that the Council having come to a decision upon this question, there ought not to be further recommendations from another committee upon it. The Committee sat a long time and inquired into the question very minutely, and after that inquiry the vote of the Council was given, when the greater part of the scheme was accepted, but one portion was rejected; and it seemed to him that after having come to a distinct decision, there was considerable danger in passing this resolution and reopening the whole question. What had been already passed was extremely simple and was all that was required, perhaps more than was required under the present conditions of pharmacy; more education was really being demanded than the pharmacists of to-day could possibly use, and he hoped this matter would not be pressed in such a way as to nauseate the chemists of this country with this grand philosophical scheme, which might not after all be a matter of practical utility.

Mr. Bottle also asked Mr. Schacht to withdraw the last two lines, as it seemed to him they were not necessary. The Committee would report anything it had to suggest, but he took it it would not be open to the Committee to take the comprehensive view which Mr. Hampson referred to. Its deliberations would be entirely confined to giving effect to the resolution of the Council; anything beyond that would be outside its duty.

Mr. Schacht said it might be remembered that there were practically four recommendations offered by the Committee, and after a considerable amount of discussion three were adopted, and the fourth was negatived by a very small majority. But between the passing of the third and the refusal to pass the fourth, there was a good deal of conversation. That fourth recommendation referred to the way in which it was suggested by the Committee that the examination should be divided. The Committee recommended that it should be divided into two portions of a certain character, and that one portion should be conducted in the provinces, and the other solely in London and Edinburgh. Between that suggestion and the process of conducting the examinations in future as they were now there were several views; amongst them was a suggestion that it should be divided, but not that any portion of it should be conducted in the provinces. Another view was that it should be divided, but that the arrangement of subjects should be different to that recommended by the Committee. There were many opinions on that point, and it seemed to him that the three recommendations which were adopted, though complete as far as they went, failed to carry out a complete scheme for the future, such as the Council could agree to, and that, therefore, it would be necessary to go a little further and do something in the way of arranging the details.

Mr. Hampson said he had asked Mr. Schacht a question, and Mr. Schacht was now going into the whole matter.

The President said he must hold that Mr. Schacht was in order. He was justifying the use of these two lines which he was asked to withdraw.

Mr. Schacht said he did not want to enlarge any further upon the point except to say that almost as matter of necessity the Committee, in considering recommendations 1, 2, and 3, must touch on the subject of number 4 more or less, and if it came to a conclusion unanimously that it was desirable somewhat to moderate the decision

arrived at on April 5, he thought it would be a pity it should not have power to present that conclusion to the Council. It was really more or less a matter of detail.

Mr. HAMPSON said he gathered that Mr. Schacht declined to withdraw the last part of the motion, and he could see quite clearly why he wished to press it as he had framed it. He evidently contemplated a re-opening of the entire subject and had very frankly stated his views. He said that the Council had accepted three propositions, but that these would not be complete without the adoption of the fourth. Although Mr. Schacht was perfectly frank and fair in so stating, he (Mr. Hampson) did not think it was altogether fair to attempt to circumvent the resolution of the Council in this way and force upon it the fourth recommendation. He admired Mr. Schacht's tenacity, but that was not what the Council wished. It had after very careful consideration accepted only three propositions, and he maintained that those three could be adopted and the details settled without entering upon the fourth at all. In his opinion the Committee ought not to reopen the matter, but abide by the motion accepted by the Council and carry it out as the Council desired.

Mr. WILLIAMS very much agreed with the view expressed by Mr. Hampson. It did seem to him very strange that when the Council had, after full consideration and discussion, come to a distinct conclusion that it should be called upon under the guise of completing and carrying out that conclusion to really agree to something which would be just the contrary. The Council had arrived at that decision by a considerable majority, but that decision, if he understood it aright, Mr. Schacht wished to reverse. Under these circumstances he must vote against the motion, unless Mr. Schacht would modify it.

Mr. HILLS asked what was the majority on April 5, on this resolution.

Mr. WILLIAMS said it was not a question of what the majority was; it was the decision of the Council.

Mr. HILLS said he thought he was entitled to ask the question.

Mr. SCHACHT said there were 8 votes for the proposition and 9 against it.

Mr. YOUNG suggested that it would be as well, since Mr. Schacht frankly stated that he intended to raise this question again, for the Council to be reminded of what the fourth proposition was.

Mr. SCHACHT said his object was to enable the Committee to arrive at a conclusion which the Council did not arrive at. The Council gave no verdict, except one, and that was, not to approve of the exact thing submitted. There were many things suggested, but nothing carried with reference to number 4; but it was imperatively necessary that something should be carried with reference to the subjects included in number 4, otherwise the Committee could not report intelligently on "recommendations" 1, 2 and 3. He only wished the Committee to have the power of completing that which was left incomplete.

The PRESIDENT said he was by no means sure that if the two lines were left out it would not be perfectly in order for the Committee to consider various points of detail in connection with recommendation number 4. The Council had decided on nothing except the broad lines. Number 4 was a recommendation that the Minor examination should be divided into two parts with an interval of not less than six months between the first and second.

Mr. HAMPSON said it was clearly understood that the Council had accepted the three recommendations. Was it now meant that this Committee would have power to make recommendations with regard to carrying out the fourth proposition?

The PRESIDENT said numbers 1, 2 and 3 could not be carried out by themselves.

Mr. HAMPSON asked if it were not possible for the Committee, irrespective of the fourth recommendation, which was rejected, to make regulations for carrying out the first three.

Mr. SCHACHT said, no, he thought not.

Mr. WILLIAMS said in that case he should vote against the motion.

The PRESIDENT then read the first three recommendations of the former Committee, which had been adopted by the Council. He said the Committee had been unanimous that the Minor examination should be divided, and it was only a question as to how it should be done.

Mr. SAVAGE said time was an important consideration.

The PRESIDENT said it appeared to him that the Committee must consider the recommendations under number 4 in some shape.

Mr. HAMPSON again stated his opinion that the three recommendations were complete in themselves. It was most irregular to include the fourth in the discussion at all.

The PRESIDENT said if the word "fourth" were obliterated from the discussion the question would be much clearer. Mr. Schacht's opinion was that certain recommendations, previously submitted by the Committee, would have to be considered in carrying out the three recommendations adopted.

Mr. GREENISH thought the portion of the motion to which Mr. Hampson objected was almost an invitation to open the whole question. It was true Mr. Schacht referred to the fourth recommendation only, but under the terms of this motion it would be competent for the Committee to open the entire question, which he thought was a dangerous proceeding whilst the resolution of the Council rejecting that fourth proposition still existed.

Mr. WILLIAMS said the motion was quite clear. The Committee was to report on the resolution of the Council, not of the former Committee. The whole sting of the thing lay in the last sentence, and the gloss Mr. Schacht had himself given of it was that it was intended to revive all that which the Council had rejected.

Mr. SCHACHT said he did not think that was a fair interpretation of it. His first explanation was simply this, that there was something left unconcluded by the Council, and that was included in a certain recommendation which the Council rejected; still that something had to be formulated in some shape. He did not say it was to be done in his fashion, but that the Committee should have the power of considering the subject and reporting upon it. He was perfectly willing to withdraw the two lines, but the subject of what was called number 4 must be taken up if the discussion of the details of numbers 1, 2 and 3 were to have any practical effect.

Mr. SYMES said if Mr. Schacht withdrew those two lines he must ask him to withdraw his name from the Committee. He could not undertake any duty which would be of such a piecemeal character as the report would then necessarily be. The first duty of the Committee would be to ascertain the legal position, and he thought it was quite possible the Council was wasting time in discussing this matter before it knew whether it had any legal power at all. Much of what he intended to say had been already said by the President and Mr. Schacht. The Committee made a report which, as far as he could judge, was complete in itself, and had four legs to stand upon, but the Council had taken away one of the legs; now the Committee were asked to report upon this three-legged arrangement. It seemed to him the Committee must deal with the whole four points to make the thing work at all, and unless it was entitled to do so its work would be useless. There were many occasions on which the Council had come to a decision by a majority of one, and had regretted that decision subsequently. There was nothing very dreadful in reconsidering the matter.

The VICE-PRESIDENT said he gathered from Mr. Schacht that he was willing to withdraw those two lines, and if he did so he hoped Mr. Symes would not withdraw his name from the Committee. Mr. Schacht had told the Council frankly what his motive was in in-

troducing those words, but he believed the whole of his object would be covered, even without them. If the Committee went into those three points and found that they formed three legs which would not stand without a fourth, it would have to report it to the Council. Without referring to the strength of the majority, he exceedingly regretted that by one vote a point which he considered of some importance was lost, and he believed when the Committee went into the details it would be found impossible not to deal in some way with the fourth recommendation. It was important that all who had worked on the original Committee should continue their labours, and therefore he hoped Mr. Symes would not withdraw.

Mr. SAVAGE could not see the logic of the Vice-President's observations. If it were to be open to the Committee to deal with this fourth recommendation, those lines ought to stand, and Mr. Schacht ought to have an opportunity of introducing anything which might be thought advantageous and necessary to consolidate the three previous resolutions. Whatever was the result arrived at, it would have to come before the Council for confirmation; therefore, he trusted Mr. Schacht would not withdraw these words.

Mr. SQUIRE agreed with Mr. Hampson. He differed from those who said that the consideration of the first three points necessitated a consideration of number 4. The first was that every candidate for the Minor should produce evidence of apprenticeship; the second that the Preliminary should be passed prior to apprenticeship; the third, that on presenting himself for the Minor the candidate should bring evidence that he had attended certain courses of lectures on practical chemistry. The fourth was that the Minor should be conducted in a certain way. Surely that had nothing to do with certificates of attendance at lectures and evidence of apprenticeship or that the Preliminary should be passed prior to apprenticeship. He could not see that the fourth had anything whatever to do with the first three. Whether it was an advantage to consider it at the same time was another point, but he thought it would simplify matters very considerably to deal with the first three first, and if necessary to deal with number 4 separately.

Mr. GOSTLING thought there was a great deal in the remarks made by Mr. Bottle, and that by cutting out the last two lines the motion would be equally effective. It was very undesirable to adopt these two lines, especially the words "together with any suggestions," because they involved a great deal more than the division of the examination. If this were omitted he should be pleased to vote for th motion.

Mr. SCHACHT remarked that it was only "any suggestion as to the result of the Committee's deliberations," and the line of its deliberations was laid down in the earlier part of the motion.

Mr. HILLS hoped Mr. Schacht would not withdraw the last two lines. If he, as one of the proposed Committee, was not permitted to say anything about the points covered by recommendation number 4, he thought a great deal of the work would be of no use, because the scheme was one which depended very much for its value on being carried as a whole.

Mr. BORLAND agreed with Mr. Hills. Without coming to some conclusion as to the mode in which the examinations were to be carried out, the Council could not come to any definite conclusion as to the first three recommendations. When the resolution was before the Council he voted against it solely on the ground that the details were not defined in such a manner as to enable him to come to a conclusion, but if the result of the Committee were such as to bring before the Council a clear and concise method for carrying out the curriculum and the examinations he should be able to come to a conclusion on the matter.

Mr. YOUNG said he was sorry to say that he must differ from his friend, Mr. Borland. He supported Mr. Schacht on the last occasion, but he thought with Mr. Bottle, who had put the matter very plainly, that with the omission of these words, the Committee would have all that was wanted, and on principle they should be omitted. But for the explanation so frankly put forward by Mr. Schacht, the Council would not have known what the sentence meant, but Mr. Hampson had admitted that if those two lines were taken away Mr. Schacht had a perfect right to make such recommendations as he desired.

Mr. SYMES said, assuming these lines withdrawn, and that the report to be drawn up included the recommendations which were related to what was known as clause number 4, would not those gentlemen, who were now taking exception to it, rise and say it was out of order, that the matter was never delegated to the Committee? With regard to the appeal made to him by the Vice-President, he was always willing to do any work on Committee if he could be of any use, and his reason for withdrawing his name was not because he felt hurt at the scope of the Committee being cut down, but he could not afford to give up time which was valuable to him in doing work which could be of no possible use.

The PRESIDENT said if such an exception were taken at the Committee, he should have ruled that it would have been perfectly competent to consider the proposition known as number 4 as supplementary to the others without the last two lines being included in the resolution, but this discussion had altered the case very materially. It indicated an intention to tie the hands of the Committee instead of leaving them open.

Mr. WILLIAMS said after the explanation which had been given he thought he could only consistently support the action of the Council by voting against this motion. He was sorry to do so, but he considered that with regard to number 4, not merely the wording but the principle involved had been rejected. He thought the best thing would be to reject the proposal *in toto*, and, perhaps, on some future occasion it might be brought forward in such a way that it might be carried.

Mr. SCHACHT asked leave to put a parallel case. Supposing the Council sent a Bill to the Privy Council for adoption, and that body declined to take it up, would the Council understand that it was never again to present a Bill to the Privy Council with any hope of its being adopted?

Mr. WILLIAMS said not the same Bill certainly.

Mr. SCHACHT said he was not asking any permission from the Committee to send up number 4 again, but anything which occurred to the Committee as a wise and sensible recommendation. He had said just previously he was willing to withdraw those lines, simply because he understood the President to hold that the subject could be gone into without those two lines, and if that were understood he would withdraw them; but if that was not the reading he could not do so, because the usefulness of the Committee would be almost entirely lost if that question were not considered.

The VICE-PRESIDENT said he considered that the ground which Mr. Schacht intended to cover would be covered by the motion, omitting the last two lines.

Mr. SAVAGE said, whilst he opposed number 4, it was only right Mr. Schacht should have an opportunity of bringing any modification of it forward again.

Mr. BORLAND thought the Council was treating the matter on too narrow a ground. It did not follow that the proposition number 4 would be recommended again; there might be an alternative suggestion. Without maturely considering the details the Council was not in a position to come to a decision.

Mr. HAMPSON then moved as an amendment:—

"That the following words be omitted from the motion proposed by Mr. Schacht:—'together with any suggestions it may desire to advance as the result of its deliberations.'"

Notwithstanding his persistent opposition, Mr. Schacht

had kindly put his name on the Committee, but he must decline to serve on these grounds. It appeared to him that the ruling of the President was likely to be of such a nature as to include the consideration of one of the recommendations which the Council had excluded by passing three only. Mr. Schacht had told the Council what position he should take on the Committee. He regretted that decision. He had no objection to serve on the Committee if its duties were confined to carrying out the decisions of the Council, but it ought not to enter into extraneous matter which the Council had already decided upon.

Mr. Young asked if Mr. Hampson objected to any suggestion the members of the Committee might make.

Mr. Hampson said not in carrying out the first three recommendations.

Mr. Young said that would avoid all reference to the way in which the examinations should be carried out.

Mr. Hampson said incidentally perhaps the Committee could not avoid it, but he was told by the President that he should rule that the fourth proposal could be entertained.

The President said that was not exactly what he said. His opinion was that any proposition under number 4, if brought before the Committee, would be worthy of consideration.

Mr. Gostling seconded the amendment.

The President thought this was a matter now to be voted upon, and that no further discussion was necessary.

On a vote being taken, 7 voted in favour of the amendment, and 7 against it.

The President gave his casting vote against the amendment.

Mr. Schacht's motion was then put and carried by 8 to 7.

Report of the Board of Examiners.

June, 1882.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (21st)	8	2	6
Minor (21st)	18	8	10
„ (22nd)	23	9	14
	—41	—17	—24
Modified (22nd) . . .	3	3	0
	52	22	30

Preliminary Examination.

Six certificates received in lieu of the Society's examination:—

2 College of Preceptors.
1 Incorporated Law Society.
2 University of Cambridge.
1 University of Oxford.

The Secretary read the following resolutions, which had been forwarded from a meeting of chemists and druggists at Aberdeen:—

"Resolutions carried at a meeting of the Chemists and Druggists of the N.E. of Scotland, held in Aberdeen, on 28th June, 1882:—

"I. That this meeting, while approving of recommendations 1 and 2, disapproves of the proposed compulsory curriculum.

"II. That in order to enable assistants and apprentices to obtain an education suitable for the successful carrying on of the business of a chemist and druggist, this meeting is of opinion that the Council of the Pharmaceutical Society should formulate a scheme for the subsidizing of approved classes for pharmaceutical education, or otherwise that the Council of the Pharmaceutical Society should memorialize the Science and Art Department anent the institution of classes suitable for the same.

"III. That in the opinion of this meeting the provisions of the Pharmacy Act should be applicable to patent medicines and the compound preparations of the Pharmacopœia, and that in the interests of the public the sale of such articles should be confined to chemists."

The Secretary also read the following memorial from the Stockport Chemists' Association:—

"Memorial to the Council of the Pharmaceutical Society of Great Britain, from the Stockport Chemists' Association.

"Stockport Chemists' Association,
"Stockport,
"*June* 19, 1882.

"Your memorialists having observed that the sale of drugs and pharmaceutical preparations by grocers, tailors, etc., is increasing, and also, that they sell them at cost price, as an inducement for the sale of their legitimate wares,

"We, therefore, strongly feeling the injustice of our position, are of opinion that in any future legislation, affecting pharmacy, some attempt should be made to secure to the qualified chemist the sale of all pharmaceutical preparations, and if possible the materia medica contained therein, with a few manifest exceptions.

"On behalf of the Stockport Chemists' Association,
"We are,
"Yours faithfully,
(Signed) "Hervey Lowndes, *President*,
"Wm. Billing Orton, *Secretary*."

The British Pharmaceutical Conference.

The following members of the Council were appointed delegates to attend the meeting of the Conference, in August:—The President, the Vice-President, the Treasurer; and Messrs. Andrews, Greenish, Hampson, Savage, Schacht, Squire, Symes and Williams.

Provincial Transactions.

MEETING OF CHEMISTS AND DRUGGISTS OF THE N.E. OF SCOTLAND IN ABERDEEN.

A meeting of the chemists and druggists of the N.E. of Scotland was held in the Imperial Hotel, Aberdeen, on the 28th inst. There were twenty-seven present, twenty-one sent in apologies regretting their inability to be present. Mr. James Paterson occupied the chair.

It was moved by Mr. W. M. Ferrier (Brechin), and seconded by Mr. J. M. Munro (Aberdeen):—"That this meeting, being of opinion that the chemists and druggists in the North of Scotland are inadequately represented on both the London and Edinburgh Councils of the Pharmaceutical Society, resolve to appoint a Committee for the purpose of inducing suitable candidates to allow themselves to be put in nomination at next election."

The motion was carried unanimously, and the following gentlemen were nominated as a Committee to carry the resolution into effect, viz.: Messrs. Burrell, Montrose; Ellis, Banff; Robertson, Elgin; Chalmers, Huntly; Ferrier, Brechin; Reid, Sangster and Strachan, Aberdeen. Mr. Strachan, convener.

It was moved by Mr. A. Strachan (Aberdeen), and seconded by Mr. Ritchie (Aberdeen):—"That this meeting approves of the report of the Committee appointed by the Council of the Pharmaceutical Society to inquire into the relation of pharmaceutical education to pharmaceutical examination, as adopted by the Council in April last."

An amendment to the following effect was made by Mr. John Gordon and seconded by Mr. R. D. Presslie, viz.:—"That this meeting, while approving of recommen-

dations one and two, disapproves of the proposed compulsory curriculum."

On being put to the meeting there voted—

For the Motion:—Messrs. Giles, Broomhead, Ritchie, Munro and Strachan, Aberdeen; Henry, Macduff; and Fraser, Clatt.—7.

For the Amendment: Messrs. Sim, Presslie; John Gordon, Johnston, Cruickshank, Spence, Mortimer and Paterson, Aberdeen; Ferrier, Brechin; Stephen, Macduff; Simpson, Woodside; Simpson, Peterhead; Bertie, Auchinblae; Fewtrell, Turriff; Sievewright, Cullen; and Clark, Portsoy.—16

The amendment was declared carried.

It was moved by Mr. John Gordon (Aberdeen), and seconded by Mr. R. D. Presslie (Aberdeen):—"That, in order to enable assistants and apprentices to obtain an education suitable for the successful carrying on of the business of a chemist and druggist, this meeting is of opinion that the Council of the Pharmaceutical Society should formulate a scheme for the subsidizing of approved classes for pharmaceutical education, or otherwise that the Council of the Pharmaceutical Society should memorialize the Science and Art Department anent the institution of classes suitable for the same."

The motion was carried unanimously.

It was moved by Mr. W. Giles (Aberdeen), and seconded by Mr. G. E. Broomhead (Aberdeen):—"That in the opinion of this meeting the provisions of the Pharmacy Act should be applicable to patent medicines and the compound preparations of the Pharmacopœia, and that in the interests of the public the sale of such articles should be confined to chemists."

The motion was carried unanimously.

It was moved by Mr. J. Hay Henry (Macduff), and seconded by Mr. Clark (Portsoy):—"That this meeting approves of the formation of a Chemists and Druggists' Society for the N.E. of Scotland, and resolves to take the necessary steps for having such a society constituted, and that it be remitted to the Aberdeen Society of Chemists and Druggists to report."

The motion was carried unanimously.

After the usual vote of thanks the meeting terminated.

ABERDEEN SOCIETY OF CHEMISTS AND DRUGGISTS.

The annual dinner of the members of the above Society was held in the Imperial Hotel, on Wednesday.

There were present—Messrs. Broomhead, Cruickshank, Giles, A. Gordon (Sim and Co.), Gordon (J. and J. Urquhart), John Gordon, Jun., Johnston (Reid and Sons), Mortimer, Munro, Paterson, Presslie, Ritchie, Sim, Sinclair, Shepherd and Strachan, Aberdeen; Bertie, Auchinblae; Clark, Portsoy: Ferrier, Brechin; Fewtrell, Turriff; Fraser, Clatt; Henry, Macduff; Lunan, Banchory; Simpson, Peterhead; Simpson, Woodside; and Stephen, Macduff.

Mr. Broomhead, the President, occupied the chair; and Mr. Munro, Vice-President, acted as croupier.

After a substantial repast, a number of toasts were proposed, including "The Queen and Royal Family," by the Chairman; "The Aberdeen Society of Chemists and Druggists," by Mr. Fewtrell, Turriff, and replied to by Mr. J. Gordon; "The Pharmaceutical Society of Great Britain," by Mr. J. Hay Henry, Macduff, and replied to by Mr. W. Sinclair, Aberdeen; "The Town and Trade of Aberdeen," by Mr. J. W. Stephen, Macduff, and replied to by Mr. D. Ritchie; "Country Friends," by Mr. J. Sim, and replied to by Mr. J. Clark, Portsoy; "The Ladies," by Mr. W. Giles, and replied to by Mr. R. D. Presslie; "The Croupier," and "The Chairman."

In the evening a number of the members drove out to Corby, where, after enjoying an hour's stroll in the pleasant grounds, they were hospitably entertained by Mr. and Mrs. Paterson.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A pharmaceutical meeting of the members of this College was held on May 16. The first paper read was the following on—

Bay Rum.

BY A. H. RIISE.

Bay rum is made by distillation of the leaves and berries of the bayberry tree with rum. Although bay rum is so much used in the United States, very little is known there about its origin, production, and the characters by which it is distinguished from imitations. A brief sketch of it will, therefore, be of interest to the druggist and importer as well as to the public in general.

The bayberry tree (*Pimenta acris*, W. A.; *Myrcia acris*, DC.) belongs to the large family of Myrtaceæ, which abound in fragrant volatile oils. The plant is glabrous, of a considerable size, the stem is straight and rigid, the branchlets green and shapely four angled, the leaves opposite, oval or roundish, shining, coriaceous, from 3 to 5 inches long, with numerous parallel nerves, and sprinkled with many pellucid dots. The flowers are arranged in axillary panicles, and are white, with a reddish tinge. The berries are round, of the size of a pea, two-celled, and contain six to eight seeds. The leaves, and particularly the berries, are of a very aromatic odour. The tree flowers from June to August.

There exist many varieties of the bayberry tree throughout the West Indies, scarcely to be distinguished botanically, but with a quite different odour from that which the genuine tree has, and, therefore, great care must be taken in collecting the leaves which are to be used in the distilling of bay spirit, as the admixture of a small quantity of the other leaves may entirely spoil the product of distillation.

In the manufacture of distilled bay spirit only the true leaves are used, and they are not dried, but thrown fresh into the still, as experience has shown a great difference between the spirits distilled from good fresh and from dried leaves, the odour of the latter being materially altered by the necessary exposure to the sun and air in drying.

The leaves are mixed, in the still, with the ripe berries in a certain proportion. The ethereal oil of the berries having a much stronger aroma than that of the leaves alone, a bay rum distilled partly from the berries has, therefore, a much stronger odour, and keeps its flavour much longer than if distilled alone from the leaves, but the cost of the berries is also from fifteen to twenty times that of the leaves, since they can only be procured with great difficulty.

The rum used for the distillation must be selected with great care. It must be of the very best quality, perfectly pure, and without any foreign odour. Rum from different sources cannot be used indiscriminately. A good St. Croix rum serves the purpose best, but it must be considerably stronger than what is generally brought into the market from there.

After having thus obtained the proper materials for the distillation, the next care is to be bestowed upon the operation. Distillation by steam, in large copper stills, ensures, to a certain extent, a uniform good quality of distilled bay spirit; it never gets burnt; the distillation is not carried too far; nothing of the fine aroma is lost by this process, which generally is the case by distilling over an open fire. Nearly all the distilled commercial bay rums are prepared over an open fire, to the great detriment of the flavour, but most of the bay rums in the market are not the product of distillation, being simply a solution of bay oil of a more or less good quality in common rum, or even in alcohol.

A comparison of bay spirit distilled from fresh material by steam with other bay rums will at once show the difference, the former being much stronger and finer in

odour, so that a small quantity of it has not merely the same strength as a larger quantity of the others, but its odour will be found to be much more lasting and agreeable.

Bay spirit is used as a wash for the face, the hands, and the whole body, refreshing and invigorating the skin, and is highly valued when diluted with water for soothing the soreness after shaving. A bath to which about a quarter of a bottle of bay spirit is added strengthens the flesh, takes away the heat and dryness of the skin, gives softness and strength to the tired limbs, destroys all smell of perspiration, and produces a feeling of invigoration. In the sick room it is invaluable, as well for the sick person as for those around him; it purifies and refreshes the air in a remarkable degree. It is inestimable to travellers, especially in hot climates or in summer in the North, quickly relieving the feelings of lassitude of voyages. In fact, its uses are numberless and, while other perfumes quickly sicken many persons with excess of fragrance and the pungency of their aroma, the consumer will never get tired of using a good bay spirit.

In the discussion on this paper this subject was said to be of importance from the little that had been published. Bay rum is hardly known on the continent of Europe, and twenty-five years ago its true origin was also unknown in the United States. In a paper published in the *American Journal of Pharmacy*, in 1861 (p. 289), it was shown that bay rum was produced from *Myrcia acris*, the material for identifying the plant being a few leaves and branchlets, without flowers and fruit. Subsequently, the late Mr. Elias Durand ascertained, through one of his West Indian correspondents, that the plant had been correctly determined, but nothing was then known of the use of the fruit in this connection. That the volatile oil of this plant contained eugenol was known for some years, but this was first published by Professor Markoe, in 1877, who had made many interesting experiments with the volatile oil distilled by himself from the leaves, which proved its close chemical relation to the volatile oils of clove and pimenta. The composition accounts for the resemblance in odour; still there is a marked difference in this respect, fully as great as, for instance, in those volatile oils which contain anisol, and the cause of this difference is as yet not known. Plants which are of near botanical relation are often of very similar chemical composition; yet in the volatile oils there is sometimes a wide difference, not merely in odour, but in their constituents. Attention was drawn to the collection of volatile oils of different species of Eucalyptus which some years ago were presented to the College cabinet by Mr. Bosisto, of Melbourne, and of which one, obtained from *Eucalyptus persicifolia*, possesses not only an odour closely analogous to, but contains also the same chemical compounds which are found in the volatile oil of bitter almonds. It was suggested by Professor Maisch that probably the volatile oils of several of the many West Indian myrtles might contain eugenol and have a more or less distinct allspice odour, but that others had most likely an entirely different composition, and that the many varieties of the bayberry tree, referred to in the paper of Mr. Riise, were really different species of the genera Pimenta, Myrcia and other Myrtaceæ.

Mr. Shinn showed four samples of commercial bay rum, of which the one made by Mr. Riise had the specific gravity ·9210, corresponding to 48½ per cent. by weight of alcohol, while the density of the others was ·9290, ·9325 and ·9380, equal to 44½, 43 and 40½ per cent. of alcohol. A specimen of St. Croix rum had the specific gravity ·930 = 44 per cent. alcohol. The fragrance of these and similar spirits may be compared by first filling a clean test-tube or small vial and then emptying it, after which the peculiar flavour and its permanence become more apparent.

(*To be continued.*)

Notes and Queries.

[729]. Tinct. Quinlæ Amm.—I think there are points in this query not cleared up by the two replies It is easy to get a clear solution if you use proof spirit, full strength, liq. ammon. (B.P. 0·959), and distilled water. The variation in the strength of liq. ammon. usually kept, no doubt, is the cause of the complaint of the quinine precipitating, and I find the use of a hard water produces the same effect, which is assisted also by the small quantity usually made and kept in stock.

A Country Chemist.

[*** Seeing that quinine is soluble in ammonia, it is questionable whether quinine is precipitated at all in this case.—Ed. Ph. J.]

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[731]. Colour of Pil. and Syr. Ferri Iodidi, B.P.—Your correspondent, "Specific Gravity," very properly calls attention to the colour of the above preparations. This might appear trivial, but for the fact that Squire's 'Companion to the B.P.' is held in such high esteem by the medical profession; and since a case in point has occurred where a medical man refused a well-made syrup, because it had the tinge of green in the transparent liquid, the words "is a transparent liquid with a tinge of green," would be better than "a colourless liquid."

This is the colour of syrup made either with the proper quantity of solution of iodide of iron and syrup, or as ordered in the B.P.

With reference to the pil. ferri iodidi, which certainly should not be black, if "Specific Gravity" were to varnish small masses of it before placing in well corked bottles, the minimum decomposition would be ensured, and then it would have the colour of the ingredients, viz., yellowish-grey.

William Fowler.

Correspondence.

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

Pharmaceutical Apparatus.

Sir,—In reply to the letter of Mr. W. Watson Will, which appeared in the Journal of June 24, I regret to say that I cannot give any information respecting the use of gas as a source of steam for laboratory purposes. We may, however, look forward to the time when gas, having been driven out of the market as a source of light (or very greatly so), it will be manufactured in great measure for the sake of the ammonia, aniline, etc.

We may then expect to have the gas supplied at such a moderate price as to be available as a cheap source of heat.

A. C. Abraham.

John.—The pin hole may be too small or the Bunsen defective. In the case of the Bunsen used by Mr. Symons the supply of air is regulated by the usual ring, so that the flame shall not descend when the gas is supplied *viâ* pin hole only, and there is still sufficient air to give a smokeless flame when full on. If your Bunsen is not so manageable, the difficulty can be overcome by placing a cap of wire gauze over its mouth.

Erratum.—In the notice of Roscoe and Schorlemmer's volume on Organic Chemistry last week it is incorrectly stated (p. 19, col. ii., l. 22) that the authors speak of the addition of methyl chloride to zinc sulphate to form zinc methyl iodide; it should have been to zinc coated with copper (copper zinc couple).

E. Hayward.—An explosion might be expected to occur when such substances are triturated together. See *Pharm. Journ.*, [2], xi., 552.

Communications, Letters, etc., have been received from Messrs. Lambie, Chipperfield, Shenstone, Warden, Peet, Chemicus.

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LIQUOR BISMUTHI. SCHACHT.

Dose, ʒj., diluted.

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Syr. Cinchonæ Alcoholicus, Schacht.

Bark minus the woody fibre. Dose, 10 to 30 drops, diluted.

Liquor Rhamni Frangulæ, Giles.

A real aperient, mild and constant. Dose, ʒij. to ʒiv., diluted.

Syrupus Sennæ Aromaticus, Giles.

Made by cold maceration—dose not gripe. Dose, ʒj. to ʒij.

Extractum Cinchonæ Liquidum, Giles

Exhausted entirely with cold water, and prepared by a process specially devised to avoid the changes inseparable from prolonged evaporation. Dose, 10 to 20 drops, diluted.

The above Preparations are manufactured by Mr. Schacht himself in the laboratory of the firm.

GILES, SCHACHT & CO.

52, ROYAL YORK CRESCENT,
CLIFTON;

And can be procured from all Wholesale Druggists in London and the Provinces.

EVANS' SALINE

EFFERVESCING.

This preparation is a mixture, in definite proportions, of Howard's Chlorate of Potash, English Tartaric Acid, Bicarbonate of Soda, and a little Cane Sugar. The proportion of these ingredients is fixed, and always remains the same. This, and the pleasant excess of acid, characterises Evans' Saline. A dry mobile powder, dissolving perfectly.

Bottles with Chemists' own name, or in bulk.

For further particulars as to price, &c., see price list.

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EVANS, SONS & CO. *56, Hanover Street,* LIVERPOOL.

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REYNOLDS' GOUT SPECIFIC.

Gout and *Rheumatism* have been cured for more than sixty years by this famous Medicine, which gives immediate relief where every other remedy has failed. SOLD in Bottles, 2*s.* 9*d.* and 4*s.* 6*d.* each, by Messrs. BARCLAY & SONS, 95, Farringdon St., London, E.C., and by the Principal Patent Medicine Vendors.

SOLE PROPRIETOR—

PERCY LITCHFIELD, 39, London Road, Twickenham.

MICHELL'S ESSENCE OF RENNET.

The Proprietor of the above can with confidence recommend it to the Trade as a superior preparation of the natural Rennet, which always gives satisfaction to customers, and will keep well both at home and abroad.

Dr. DOBELL (in the 7th Edition of his work on Diet and Regimen in Sickness and Health) says—"One of the best Essences of Rennet is Michell's, sold by Baynham, Rye Lane, Peckham."

SOLE PROPRIETOR AND MANUFACTURER,

W. B. BAYNHAM, 6, RYE LANE, PECKHAM,
LONDON, S.E.

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BENGER'S PREPARATIONS.

These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

Of all leading Wholesale and Retail houses.

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DINNEFORD'S FLUID MAGNESIA.

Perfect in Purity and uniform in Strength.

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LICENSED MAKERS

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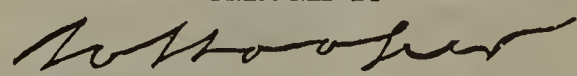
WHOLESALE DRUGGISTS,
23 & 24, REDCLIFF STREET, BRISTOL,

Who offer the finest pale steam refined COD LIVER OIL, in original 25 gallon tin-lined casks, and can now supply Rectified Spirits of Wine in quantities of two gallons and upwards.

PULVIS JACOBI VERUS,

PREPARED BY



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Contains 11·1 per cent of Iodine.

One vol. added to seven vols. *Syrupus B.P.* forms SYR. ACIDI HYDRIODICI. Manufactured by

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TASTELESS PILLS

(COX'S PATENT.)

Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. per pound, coated, as a good general saleable Pill. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. *in the Shilling will be allowed if stamps or P.O.O. are remitted with order.*

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

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Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

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LAC BISMUTHI ET CERII, &c.

SYMES & CO., LIVERPOOL.

LONDON DEPOT: 7, SNOW HILL.

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GREAT REDUCTION in the Prices of

New Dispensing Bottles and Phials of the best quality.

H. HARRIS & Co., Glass Bottle Manufacturers,

Office, 153, Upper Thames St., have reduced their prices as under for quantities of not less than 6 gross of assorted sizes.

	per gross.
3 & 4 oz., clear blue tinted, plain or graduated	7s. 6d.
6 & 8 oz., " "	8s. 6d.
½ oz. and under, white moulded phials	4s. 0d.
1 oz. " " Plain or graduated to teaspoons. Long or short series.	4s. 6d.
1½ oz. " "	5s. 0d.
2 oz. " "	6s. 0d.

We put **Name and Address on the flat shape bottles, if required, without any extra charge whatever.** Country packages 1s. each. P. O. Orders to be made payable at Chief Office, London. Bankers, London and Westminster Bank. Established upwards of Fifty Years.

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PURE AERATED WATERS

Ellis's Ruthin Waters,

CRYSTAL SPRINGS.

Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.

CORKS BRANDED "R. ELLIS & SON, RUTHIN," and every label bears their trade mark. Sold everywhere, and Wholesale of R. ELLIS & SON, Ruthin, North Wales. London Agents: W. BEST & SONS, Henrietta St., Cavendish Sq.

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W. KEMP is now offering NEW PALE HONEY of choice flavour at a remarkably low price, in free packages of different sizes; also in handsome glass jars of 1 lb. each. Samples and quotations free. Also, FRENCH BEESWAX, in bricks of ½ lb. each, and JAMAICA BEESWAX, in 3 lb. cakes, of first-class quality and free from dirt. Samples free.

WM. KEMP, High St., HORNCASTLE.

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IN THE

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The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

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1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

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J. & A. Churchill, 11, New Burlington St., London, W.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.

A MONEY SAVING TEA. ABSOLUTELY PURE. The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.

BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.

Prospectus and samples free on application.
Warehouses, 154 and 155, Whitechapel Rd., London.

P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

SPECIAL NOTICE.

WILLS' UNIVERSAL POSTAL SYSTEM

Will be carried on as usual during the Vacation. Students can enter at any time.

MAJOR	Fee, One Guinea.
MINOR	Fee, One Guinea.
MODIFIED	Fee, One Guinea.
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Those Students who failed at the recent Preliminary Examination, should join at once, in order to insure success at their next attempt. References given to successful candidates.

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"The idea on which this system is based is to arrange for each student his course of study for him, and to provide him generally with that knowledge which he needs to know."—*Chemist and Druggist.*

"Mr. Wills, of Westminster College, one of our most thoroughly successful tutors, extends him a helping hand, leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness."—*Magazine of Chemistry and Pharmacy.*

"The postal system of lectures, specimens, autograph prescriptions, &c., is freed as much as possible from all suspicion of 'cram.'"—*Chemists' Journal.*

BEWARE OF SPURIOUS IMITATIONS.

For syllabus and full particulars apply (enclosing stamp) to
E. WALDEN, *Secretary.*

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. Dawes, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

A few sheets placed among Clothing, Woollens, Furs, or Feathers, afford positive protection against the Ravages of Moths and other insects. Cleaner and far more efficacious than Camphor and Insect Powders. Price 1s. per packet, containing twelve large sheets. Wholesale Agents :—Barclay, Newbery, Edwards, Sanger, Maw, Lynch, and all Patent Medicine Dealers, who will supply handsome Show Cards upon application.

No packet genuine unless signed—

WILCOX & Co., 239, Oxford St., London.

MYOCOM FLY GUM

FOR CATCHING FLIES.

Sold in 1/- boxes by all Chemists and Grocers, or sample can be obtained by post for 1/2. **Liberal Trade Terms.**

THOS. CHRISTY & CO.
155, FENCHURCH STREET, LONDON.

THE

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The last course of the present session has now commenced, which will terminate at the July examinations.

The fifth session of this School will open on September 1st, entries for which should be made to

Messrs. LUFF & WOODLAND.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. Parsing made easy, English and Latin, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

PRIVATE TUTOR.

Mr. JAS. W. SAUNDERS, A.P.S., G.S.T., &c.

130, CAMDEN ROAD, N.W. (note change of residence).

TWO out of **FOUR** of my Students passed at the JUNE MINOR. Special teaching (private or postal) for JULY candidates. At home for interview daily from 1 to 2.30.

Laboratory close to Gower Street Station.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

THE WESTMINSTER COLLEGE

The next Session will commence on

Friday, September 1st, with an Introductory Address by Mr. GEORGE WILLS, Principal. After which the Prizes will be distributed.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

Since the opening of the present Session (September 1st) the Editors of several of the leading Journals, and representatives of the press, have visited the Westminster College, and pronounce it to be the most complete establishment of its kind in England.

The soundness and thoroughness of the education is demonstrated by the fact that nearly half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College.

The subjoined Pass-list for this month speaks for itself, and is a more reliable guide than flattering Advertisements, in enabling Students to decide at which School they can prosecute their studies with the greatest success. Columns might be written upon the numerous advantages offered by this College, but we prefer to rely upon results.

LONDON MINOR EXAMINATION.

JUNE, 1882.

41 Candidates were examined. **24** Failed. **17** Passed.

FROM THE

WESTMINSTER COLLEGE.

14 presented themselves, the following **9** passed

ARKLE, C. A. Lancaster
COOMBS, W. T. Brentford
ELTON, T. F. Cirencester
HILL, A. Leicester
COATES, U. A. Walsall
HUMPHRIES, J. Cleckheaton
RICKETTS, J. Plymouth
SPENCER, G. Hitchin
THOMPSON, C.L. London

FROM ALL OTHER

SOURCES COMBINED.

27 presented themselves, the following **8** passed.

BIRD, F. C. I. Bath
DANGERFIELD, W.H. Devizes
DARCH, A. Islington.
HALL, J. T. Manchester
LOWTHER, T.W. Cardigan
MILLS, A. E. Herne Hill
WILKINS, E. Reading
WILLCOCKS, A.S. Portsea

Mr. W. TWISS was also successful in passing the Modified Examination from this College.

Gentlemen who have previously failed, or are advanced in their studies, can attend the present Course of Lectures for the July Examination. Fee £2 2 0.

For revised prospectus and further particulars, apply to

E. WALDEN, Secretary.

TRINITY SQUARE, LONDON, S.E.

MINOR & PRELIMINARY.

TULLY'S Postal System is the most successful method of preparing without leaving business. Fee—MINOR, One Guinea. PRELIMINARY, 10s. 6d. Send stamped envelope for particulars and *original Testimonials* (*not Copies*) to Mr. J. TULLY (Hills Prizeman), Chemist, Tunbridge Wells. Established 1872.

ENGAGEMENTS WANTED.

AS JUNIOR, in good house, with opportunity of improvement. Age 19½. Height 5ft. 6in. 4 years' experience. Excellent references. G. LUCK, 29, St. James' Rd., Southsea.

IMPROVER. By a youth, 18 years of age, a situation as above. Has been 3 years in the trade (Chemist and Druggist). Country preferred. For particulars, apply to W. G. ROBERTSON, Harold House, Waltham Abbey, Essex.

AS IMPROVER. 2½ years' experience. Height 5ft. 4in. Mixed country business not objected to. Send particulars to J. E. H., 41, South St., Isleworth, Middlesex.

AS JUNIOR, or DISPENSER to Surgeon. Age 21. Height 5ft. 9in. 7 years' good experience. Can Extract Teeth. Out-door. Nottingham preferred. ALPHA, 1, Nuttall Ter., Buxton.

AS JUNIOR. 5½ years' experience. Permanency desired. Height 5ft. 8½in. Good references. Disengaged after July exam. E. H. J., 68, Lambeth Rd., S.E.

AS DISPENSER or JUNIOR. London or suburbs preferred. Age 21. Height 5ft. 6in. 6¼ years' experience. H. B., care of A. Greaves & Son, Ironville, Alfreton.

MORNINGS only. From 9 till 1. Salary nominal, having another engagement. F. G. TAYLOR, 56, Lamb's Conduit St., W.C.

AS ASSISTANT. In town. Age 22. 5½ years' experience. F. KIRKHAM, 49, High St., Hampstead, N.W.

TEMPORARY.—A qualified gentleman seeks an ENGAGEMENT to take charge during illness or absence of principal. Age 36. North or South Wales preferred. T. E. THOMAS, 34, Trafalgar Ter., Swansea.

ASSISTANT, in the Wholesale or otherwise, former preferred. Accustomed to country and town business, with Dispensing, Prescribing, and Extracting Teeth. Age 28. C. K. SAWER, Post Office, Romford, Essex.

AS out-door ASSISTANT or MANAGER, by a married man. Age 30. Speaks French. Good experience. Permanency desired. K., 26, Vincent Sq., S.W.

AS ASSISTANT. Temporary preferred. 20 years' experience and good references. Disengaged. BETA, Messrs. Barron, Harveys & Co., Giltspur St., E.C.

OUT-DOOR ASSISTANT or MANAGER of Branch. 6½ years in last engagement. Good testimonials. Town or suburbs. I., 10, Coln Villas, Mill Hill Rd., Acton.

IN good business. London or large town. 7 years' London experience. Qualified. Age 32. Salary moderate. Disengaged. J. W. N., Green Lane, Dalton, Huddersfield.

A FEW hours' daily employment required, either with Chemist or Surgeon, in town. Can arrange time. Age 31. Good references. CHEMIST, 52, Great Dover St., Boro', S.E.

AS MANAGER (Branch or otherwise). Registered. Thorough practical experience in first-class business. Good references. CHEMICUS, 47, Tollington Rd., Holloway, N.

AS MANAGER or SENIOR, for a month or two. Qualified. Thoroughly efficient. Age 25. Disengaged by the 17th. Further particulars from M., 48, York St., Portman Sq., London, W.

ENGAGEMENTS WANTED.

LOCUM TENENS. Mr. W. B. WEST, Staines Rd., Hounslow. Over 30 years' town and country experience, and unexceptionable references extending over the last 12 years. Disengaged 20th inst.

DISPENSER to large Infirmary desires employment from 6 p.m., daily. B., 14, Myddelton Sq., E.C.

AS JUNIOR or IMPROVER in a good class Retail and Dispensing business. Age 19. 4 years' experience. Excellent references. For particulars, A. FELCE, 6, Ewell Road Villas, Surbiton Hill, S.W.

SWEDISH Chemist (25), speaking French, German, and English partly, desires situation in English Pharmacy. Conditions sufficient for full boarding. Highest references. GRAFSTROM, Pharmacie l'Avenue de l'Opéra, Paris.

AS JUNIOR. Age 21. Height 5ft. 7in. 5 years' experience. W. G. H., 425, South Rd., Walkley, Sheffield.

AS JUNIOR or IMPROVER in a good Retail and Dispensing business. E. J. H., 6, North St., Taunton, Somerset.

AS JUNIOR. Out-door. In a Mixed business. 6 years' experience. Age 24. Can Extract Teeth. W. H., care of Mr. Wild, 1, Goodwin St., Bradford Rd., Manchester.

AS JUNIOR, in a good Dispensing business in London or suburbs. Age 21½. 6½ years' experience. Good references. D. T., 13, Cardiff St., Aberdare.

AS JUNIOR, DISPENSER to Chemist, or DISPENSER and BOOKKEEPER to Surgeon. 10 years' experience. Latter part of time with Retail Surgeon. G. SHRUBSOLE, Albert St., Whitstable, Kent.

AS JUNIOR or IMPROVER. 3½ years' experience. Age 20. Good Bookkeeper. West of England or S. Wales preferred. A. C., 1, Windsor Pl., Clevedon.

AS MANAGER (temporary), or with view to partnership or succession. A. H., 2, Upper St., Islington.

AS MANAGER, out-door ASSISTANT, or DISPENSER to Surgeon. 11 years' experience. Good Prescriber. Highest references. Age 27. Married, no family. Disengaged. CAPLEN WOOLDRIDGE, 11, Woodwell Cres., Bristol.

AS temporary ASSISTANT. Age 22. Good references. K., 33, West Sq., Southwark, S.E.

ASSISTANTS WANTED.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior ASSISTANT, with Minor qualification. In-door.

SOUTH Africa.—A qualified ASSISTANT, for Dispensing and Retail business at Kimberley. Also a qualified ASSISTANT, with a thorough knowledge of Homœopathy. 3 years' engagements in both cases. Salary, £120 the first year, £150 the second year, and £180 the third year, with commission. Lodging provided. First-class passage and coach fare paid. Address, B. G. & Co., 27, Wool Exchange, Basinghall St., London, E.C.

THE end of July.—A competent ASSISTANT, accustomed to a Dispensing and Family business. Churchman preferred. State height, age, and salary required. In-doors. Apply, R. M. PRATT, Chemist, Otley, Yorks.

A YOUNG MAN. 20 or 21 years of age. One used to a good-class Mixed country business. Must be an accurate Dispenser and able to produce unexceptionable references as to character. No other assistant kept. Apply to THOMAS DIXON, Chemist, Rickmansworth, Herts.

HOPWOOD & SON, Hill St., Richmond, Surrey, have a vacancy for a JUNIOR, about 23 years of age, accustomed to first-class Retail, and who must be well up in Dispensing. Personal interview desired. For full particulars, apply as above.

ASSISTANTS WANTED.

IMMEDIATE.—A reliable ASSISTANT, for a first-class business. Salary £50. Address, with full particulars, enclosing carte (to be returned), JOHN FACEY, 51, White Ladies Rd., Clifton.

A COMPETENT ASSISTANT, and used to a good-class Dispensing and Family business. Apply, stating age, height, references, and salary required, to JNO. HALLAWAY, 52, Castle St., Carlisle.

AT once.—A JUNIOR, accustomed to Dispensing. State all particulars, give references, and enclose carte, if possible. Applications not answered in 3 days declined. Apply to J. E. PLUMB, Soho Hill, Handsworth, near Birmingham.

AUGUST 1.—A gentlemanly ASSISTANT, about 28, as SENIOR. Qualified. Good writer. One seeking permanency preferred. Apply, with carte and usual particulars, JAMESON & CURTIS, Hastings and St. Leonards.

IN-DOOR ASSISTANT, for light Retail and Dispensing. Salary beginning at £40. One seeking permanency preferred. If by letter, please enclose carte, to CHEMIST, 160, Rye Lane, Peckham.

FOR a West-end business. Hours moderate, duties very light. A competent ASSISTANT, of good appearance, who can produce unexceptionable references. Only those requiring permanent situation need apply. State height, age, salary required, references, also send photo. (returnable), to P. WELLS, 50, Elgin Cres., Notting Hill, W.

A SENIOR. At once. Thorough business-like man, of good address, and writing a good business hand. Liberal salary given to one suitable. F. K., 70, Kennington Park Rd., London, S.E.

AN ASSISTANT. Age about 24. A neat and accurate Dispenser. Accustomed to Prescribe and Extract Teeth. Good references indispensable. Salary £40. Apply to Mr. A. J. BROWN, Chemist, 55, Trafalgar Rd., Greenwich, S.E.

A COMPETENT, trustworthy ASSISTANT, of good address. Must be well up in Retail, Prescribing and Dispensing. Able to take entire charge if required, and willing to assist in postal duties. One acquainted with Dentistry preferred. Unexceptionable references required. W. PARRY, 148, King St., Hammersmith. Applications not answered in 3 days declined.

A COMPETENT ASSISTANT as Senior, in a light Retail and Dispensing business. Age about 26 years. Passed Minor preferred. Salary £60. Apply, with full particulars, to JOHN SARGANT, Chemist, Reigate.

A COMPETENT, trustworthy ASSISTANT (out-door), of good address, age about 24, for a Mixed country business. A good Prescriber and able to Extract Teeth. Good references indispensable. Apply, stating age, height, salary, enclosing carte (to be returned), to FRANCIS CLATER, Pharmaceutical Chemist, The Square, Retford.

G. T. W. NEWSHOLME, Pharmaceutical Chemist, Sheffield, requires an ASSISTANT, about 24 years of age. One well up in the making of pharmaceutical preparations, &c. Apply, stating age, height, reference, salary required, &c.; also enclose carte, if convenient.

IMMEDIATELY.—A competent ASSISTANT, of good address, about 24 years of age, accustomed to Dispensing. A qualified man preferred. To live in-door. STEVENS, Chemist, 19, Wigmore St., Cavendish Sq., W.

FOR a Provincial Wholesale, an ASSISTANT, well accustomed to both Wet and Dry counters. State age and salary required (out-door), to B. & B., care of Cox, Poulson & Co., Chicksand St., E.

SENIOR ASSISTANT. In-door. Commanding good references, and with town experience preferred. Apply (if by letter, state full particulars as to salary, &c.) to W. TWINBERROW & SON, 71, Westbourne Grove, Bayswater, W.

ASSISTANTS WANTED.

JUNIOR ASSISTANT. Accustomed to Dispensing and good-class business. Applications, with full particulars of age, height, salary required, and references, to W. H. GIBSON, Chemist, 107, King's Rd., Brighton.

APPRENTICE. By qualified Chemist. In one of the best towns in the county of Lincoln. Shop in best situation in the town. Excellent opportunity for learning all branches of the business. Apply, A. B., care of Mr. Dolby, 66, High St., Stamford.

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

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Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

Third Prize.—The Pharmaceutical Society's Medal in bronze, and a present of books value £2, or thereabouts, given by Mr. T. H. Hills.

The Examination for these prizes will be held in London and Edinburgh on Thursday, the 27th instant, at 10 a.m.

Pharmaceutical Chemists who have passed the Major Examination during the present Session, and who were Associates of the Society at the time of passing the Examination, are entitled to compete for the prizes.

Persons intending to compete must give notice of their intention to the Registrar, on or before Saturday, the 22nd instant, after which no further entries will be received.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions :—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

READING COVERS FOR JOURNAL.

COVERS with strings to hold 26 numbers of the Journal may be obtained of the Publishers, Messrs. CHURCHILL, 11, New Burlington Street, W., price 2s. each.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in February, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

LECTURES.

CHEMISTRY AND PHARMACY.

They comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

BOTANY AND MATERIA MEDICA.

They comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

PRACTICAL CHEMISTRY.

The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date*. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE Daughter of an old Member, and one of the Founders of the Society, is in great distress, and makes an appeal to the generosity of the readers of the Journal. Her Father died some years ago, leaving only a small annuity to support his widow and children, which lapsed on the death of the former. The daughter is 35 years of age, quite unable from ill health to contribute to her living, and is not eligible for aid from the Society's Benevolent Fund. The case is well known to Mr. Bremridge, who has kindly contributed £5 from his Casual Fund, and has also given £1 as a private subscription. Further sums will be thankfully received by Mr. STICKLAND, 23, Cromwell Place, S.W.

Mr. Bremridge	£1	0	0	Mr. Stickland	£1 11 0
Ditto, Casual Fund	5	0	0	Mr. Sainsbury	0 10 6

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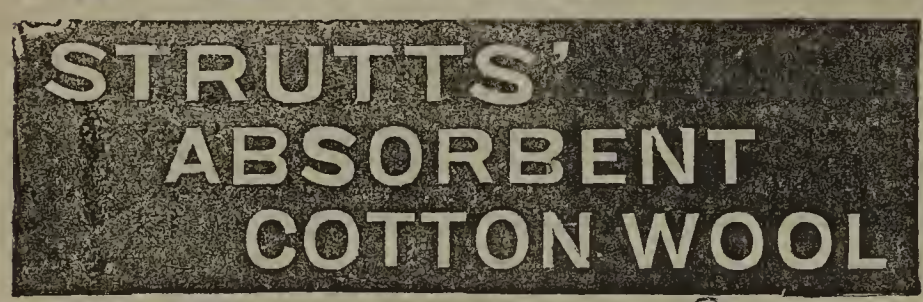

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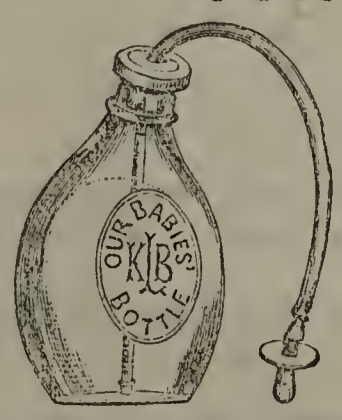

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In order to avoid effete and doubtful varieties, **THE PUBLIC ARE CAUTIONED** to see that every bottle bears the label of the **ÆSCULAP BITTER WATER COMPANY** (Limited), **SARACEN'S HEAD BUILDINGS, SNOW HILL, LONDON.**

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Respectively 8 and 4 times the strength of the Spirit.

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On Thursday, June 10th, 1880, before Vice-Chancellor Sir C. Hall, an application was made in the action of Bush *v.* Young to commit the defendant to prison for disobeying an injunction whereby he had been restrained from selling, imparting, or publishing a recipe, which is an infringement of a certain patent known as "Gum Extract," the property of the plaintiff, which is used in the mineral water trade for giving a creamy head or foam to ginger beer and other beverages; the defendant having published and sold a recipe for the preparation of the same compound under the name of "Compound Fluid of Saphacarnium," to be used for the same purpose. The defendant resisted on the ground that the bark used by him was not the same as that used by the plaintiff, being known as "Panama Bark."

The plaintiff, however, proved that this was in fact the same, and the court granted the injunction. The defendant also threatened to publish the recipe unless it were bought up by the plaintiff.

His lordship made an order that in default of defendant paying the costs, he should stand committed to prison.

All persons infringing the above patent, either by selling or using, will be proceeded against, and those who give information of such infringement will be liberally rewarded.

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Distillers and Importers of

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FOR THE MANUFACTURE OF

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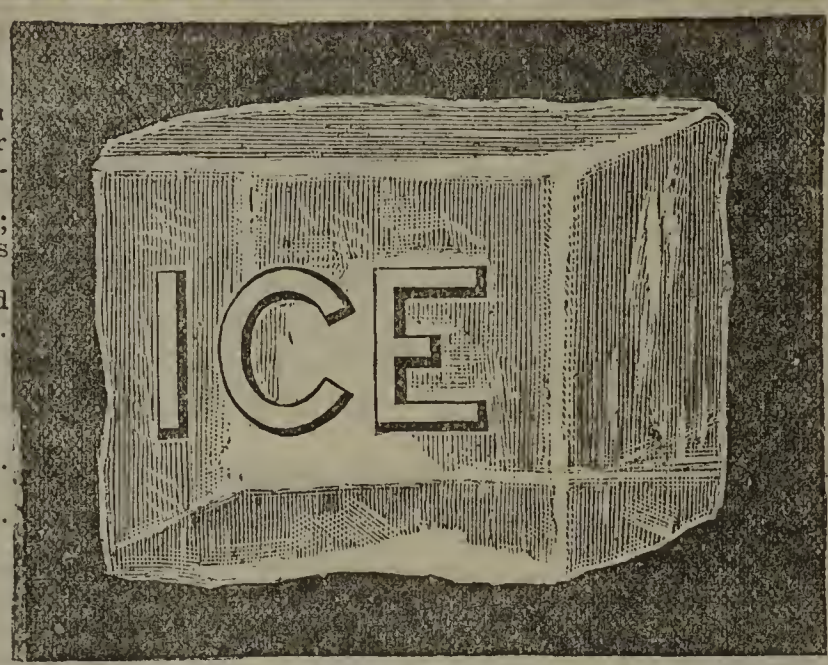

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THE INTERNATIONAL ELECTRIC EXHIBITION.

(*Continued from Vol. XII., page* 1032.)

The fact of a continuous solid conductor being raised to incandescence by the passage of a current of electricity of sufficient volume through its substance has been known from the earliest days of current electricity, and the heating of metallic wires by the transmission of a current of electricity has received thorough investigation at the hands of the older experimenters. Among those who have worked at this subject may be mentioned the great names of Davy, Faraday, Joule, Becquerel, Lenz, Harris, Grove, De la Rive Fourcroy, Vauquelin and Thenard.

Joule's masterly experiments resulted in the discovery of the law of the heating effect of a current. This law has been given in a previous paper when treating of the "electric arc;" but being peculiarly apposite in the present instance it may be stated once more—

$$H = C^2 R t \times 0{\cdot}24.$$

Where C is the current in ampères, R the resistance in ohms, t the time in seconds, and H the amount of heat produced in gramme degrees. It can be shown from this law that* "*a current of* 1 *ampère flowing through a resistance of* 1 *ohm developes therein* 0·24 *heat units per second.*"

When *the same* current passes alternately through a thick and a thin wire of the same metal, the thin wire becomes hotter than the thick one; this follows from the greater resistance of the thin wire, and also on account of its smaller capacity for heat and lesser radiating surface. Different metals having unlike specific resistances, and the heating effect being directly proportional to the resistance, it follows that in wires of different metals having the same length and diameter, the greater resisting wires will become the most highly heated. For instance, in similar wires of copper and platinum, ten times more heat would be produced by the same current in the platinum wire than in the copper wire, as the specific resistance of platinum, according to E. Becquerel's determinations, is ten times greater than that of copper. The heat produced in a wire is of the same amount, whatever may be its length, provided its diameter be the same throughout, *and the same quantity of electricity passes through it.* Faraday has left it upon record that the same current that will heat an inch of wire to redness will heat a mile or even a thousand miles of similar wire to the same extent. This statement is strictly true. It must, however, be remembered that as the length of the wire increases, the resistance increases proportionately; and so in order that the *same current* may flow, it follows that the electromotive force must be increased proportionately. This may easily be seen as a consequence resulting from Ohm's law (*Pharm. Journ.*, xii., p. 822). As regards the influence of the diameter of the wire on the amount of heat produced, it has been deduced from Newton's law of cooling that "for the same quantity of electricity, the increase of temperature in different parts of a wire is inversely as the fourth power of the diameter."

The foregoing considerations will greatly assist in the discussion of the various methods of obtaining light by the incandescence of a solid conductor.

As far as can be ascertained it was not until the year 1845 that any attempt was made to utilize an electrically incandescing solid conductor as a source of light. It would seem that the merit of being the first experimenter in this direction rests with Mr. Edward Augustin King, of London. Mr. King's patent is dated November 4, 1845. The preamble of the specification commences by stating that "this invention has for its basis the use of metallic conductors or of continuous carbons, heated to whiteness by the passage of an electric current. The best metal for this purpose is platinum; the best carbon is retort carbon." The lamp consisted of a vertical incandescent conductor of retort carbon generally resting upon conducting blocks at each end; from these blocks proceeded metallic conductors. Parallel with the incandescent rod was a bar of porcelain attached by metallic arms to the conducting blocks. One of the metallic conductors passed into a bath of mercury; the conductor in connection with the other end of the incandescing carbon passed through the upper part of a cylindrical glass envelope, which covered the whole arrangement. The lower narrower part of the glass cylinder was continued as a barometer tube, about 30 inches long. The lamp was exhausted of air by filling the lamp and the attached barometer tube with mercury; on inverting the entire apparatus the glass cylinder containing the rod of carbon emptied itself of mercury, thus forming the torricellian vacuum. The mercury in the barometer tube was made part of the electrical circuit. No dimensions are given of the carbon rod; the patent specification merely states that the retort carbon may be made into pencils or thin plates by the aid of saw and file. If platinum were used it was to be worked into thin sheets a quarter of an inch broad and of a length proportional to the number of battery cells used. The method recommended for obtaining the platinum in thin sheets was to place a piece of platinum foil between thick plates of copper and reduce the whole to a thin sheet by rolling; by this means the sheet would be of equal thickness throughout. The patentee makes the curious and interesting statement that, by this method of rolling, the platinum may be obtained so thin that on holding it before a printed page the letters can be distinguished through it. This early attempt to produce an incandescent lamp must be pronounced an extremely creditable one. The distance between King's thin carbon rod and the modern carbon filament cannot be considered remote. King's invention was much ahead of his time, and it really does seem as though, if the period had been favourable to such an invention, the "carbon filament in a vacuum" might have been a matter of near forty years ago instead of a thing of to-day.

The next advance was made by Greener and Staite, in 1846. These inventors devoted their experimental efforts to the preparation of purified carbon and the fashioning of this manufactured carbon into rods, hollow cylinders or square prismatic shapes. This patent is another striking example of the aphorism which declares that "there is nothing new under the sun." The patent practically, with slight exceptions, describes the modern manufacture of carbon rods for arc lights.

Messrs. Greener and Staite note that when carbon, in the purest state hitherto obtainable, is ignited by an electric current in an air-tight glass vessel the glass becomes obscured by the volatilized impurities.

* Silvanus Thompson.

The process of the inventors has for its object the removal of this inconvenience. They take lamp-black, charcoal or plumbago, or preferably* Church's patent coke in fine powder. The finely powdered material is digested with dilute aqua regia, afterwards washed with a weak alkaline solution, and finally with distilled water. The purified carbon obtained in this manner is dried and pressed into solid prisms or into cylinders, either hollow or solid, by means of hydraulic or screw pressure or by a fly press, "in the same way as the well-known porcelain buttons are formed." Sometimes to ensure better dryness and homogeneity the moulded carbons are exposed to intense heat in a furnace for twenty-four hours.

The lamp in which these purified carbons are used consists of an air-tight globular glass vessel containing two platinum cones whose bases face each other. In these cones is fixed a rod of the purified carbon, which may be either plain or have projecting points formed on its surface. This latter feature is claimed as an improvement, and some little stress is laid on it. The ends of the platinum cones are attached to the terminals of the battery. The inventors do not definitely state whether the containing vessel was vacuous or not, nor do they think it necessary to say how the external connections were made. Greener and Staite's incandescent lamp is thus seen to be identical in principle with King's. In practice, however, no doubt the superior purity and homogeneity of the prepared carbon rod would be found of material advantage, both as regards economy and durability.

In 1849, Petrie obtained a patent for an incandescent lamp, in which it was proposed to use rods of metallic iridium as the incandescing material. The iridium was to be fused in the electric arc and in some way formed into an ingot, which was then to be cut into rods of suitable shape. These iridium rods were to be used in place of the carbons used in the previous lamps. This scheme cannot be regarded as an advance on the previous ones, either as regards practicability or economy; indeed, it was undoubtedly somewhat retrogressive.

According to Fontaine, several other patents have been taken out in America, France and England for obtaining light by the electrical incandescence of a conductor, but he states that none of them are more complete or practicable than the method proposed by King.

* Church's patent coke was purified by an extraordinary kind of electrical process. The following are the details given in the patent which was taken out in 1845. As soon as the flame on the ignited mass of coal in the coke oven begins to die away, the air apertures are closed and through the temporary brickwork an iron-rod is introduced into the ignited coke near the bottom of the mass, and another iron rod is laid on the surface of the coke, taking care to make as good a contact as possible. The lower iron rod is made the positive electrode of a powerful battery, and the upper rod is arranged to complete the circuit. Care is taken that no short circuiting of the current occurs. Six tons of coke are said to require two hours of this electrical treatment. Church states that by repeated analysis he has found that the electrically treated coke is freer from sulphur than the same coke untreated, in the proportion of twelve to one. This statement is made so clearly and definitely that it is perhaps worth while for interested proprietors of coke ovens who have a dynamo machine in the works to consider the advisability of ascertaining whether any such obscure reaction takes place or not.

The whole subject appears to have been forgotten and lost sight of until 1873. In that year M. Lodyguine, of St. Petersburg, brought forward a lamp which appears to have been a reinvention of the leading principle of King's lamp. The St. Petersburg Academy of Sciences, however, awarded a substantial prize to Lodyguine for his invention. In the report made to the Academy upon it, it is stated that M. Lodyguine was the first who had conceived the idea of replacing the incandescent platinum by bars of carbon (coke) analogous to graphite, retort carbon being meant probably. It is evident from the preceding matter that this statement was a mistake, and the incandescent carbon lamp may be fairly regarded as of English and not of Russian origin.

The next inventor after Lodyguine appears to have been M. Konn, also of St. Petersburg. His lamp was apparently an improvement on its predecessors, as in this lamp arrangements were made so that when a carbon rod burnt out or failed, another rod was automatically put in circuit; no extinction of light therefore occurred until the second rod failed. Konn's lamp appears to have found some little practical application in Russia. Although the lamp was vacuous, the carbons only lasted on an average two hours each.

M. Bouliguine, another Russian, designed an incandescent carbon lamp with one long carbon rod, of which only a portion was incandescent at once. As the carbon rod consumed it was raised by the joint action of a counterweight and an electromagnetic contrivance. The additional complexity of M. Bouliguine's lamp would probably be found in practice to have little advantage over Konn's arrangement.

The foregoing descriptions are representative of the most important developments of this interesting subject, with one important exception, which will be dealt with fully later on. The record now reaches down to the time when Mr. Edison began his experiments in electric lighting, which have now reached such a successful issue.

(*To be continued.*)

NOTE ON THE PRESENCE OF A SECOND POISONOUS PRINCIPLE IN THEVETIA NEREIFOLIA.

BY C. J. H. WARDEN,

Bengal Medical Staff, Professor of Chemistry, Calcutta Medical College.

In the annual report of the Chemical Examiners' Department for 1880–81, the poisonous nature of thevetin,—a glucoside, isolated by De Vrij, contained in the kernels and bark of the *Thevetia nereifolia* plant,—was maintained. A further examination of the kernels has resulted in the detection of a second poisonous principle, apparently of greater activity than thevetin.

This second principle was obtained by precipitating the mother-liquor left after the crystallization of thevetin by aqueous tannic acid, and decomposing the precipitate by lime. By the action of absolute alcohol a yellow extractive was obtained, which had the following properties: it was persistently bitter, non-crystalline, and readily soluble in water. On aqueous solutions reagents produced the following effects: concentrated nitric

or sulphuric acid, a yellow coloration; concentrated hydrochloric acid, no change in the cold or on heating; bichromate of potash and sulphuric acid, ferric chloride, or chlorine water and ammonia, no colour reactions; tannic acid, a white precipitate. ·017 of a gram injected into a cat's stomach caused in five minutes convulsive movements of the hind legs, which lasted for some time; there was also vomiting and profuse salivation. The cat recovered.

The amount of this principle isolated was only ·067 of a gram, so that it has only been possible to make a very cursory examination of its physical and chemical properties. It appears to differ from thevetin in a marked manner. Pure thevetin is white and crystalline, and only faintly bitter, and its aqueous solution is not precipitated by tannic acid. At present, through lack of material, I am unable to continue the investigation, which, however, I trust I shall be in a position to complete before the end of the current year.

THE ANALYSIS OF WINE.*

BY J. NÉSSLER AND M. BARTH.

I. Determination of the Amount of Extract.

The methods at present in use for the determination of the amount of extractive in wine differ from one another not only in subordinate details, but also in principle, according as extract is understood to mean the constituents of the wine absolutely non-volatile without decomposition, or the wine deprived of its water, alcohol and volatile acids. In the former case it is especially necessary to volatilize the glycerine completely without partially decomposing the non-volatile constituents of the wine through submitting them to too high a temperature. Determinations of extract in this manner are usually made with only a small quantity of wine (5 or 10 c.c.), which is heated upon a water-bath so long as water is perceptibly driven off, and the drying is then continued in an air-bath at 110° C., or preferably *in vacuo* until the weight remains constant. The other kind of determination has for a special object the retention of the glycerine as completely as possible in the extract. This can be effected either by avoiding raising the temperature above 100°, or by making an addition to the wine which will prevent the volatilization of the glycerine at a temperature of from 110° to 115° C.

In estimating a wine extract the authors concentrate 50 c.c. of the wine to a syrupy consistence on a water-bath, and then further dry it for three hours at the temperature of boiling water. In order to maintain this temperature exactly they used a jacketed apparatus, arranged like a paraffin drying chest, the interspace being filled with boiling water, and made sufficiently large for the water to be maintained in vigorous ebullition during four hours without exhaustion.

In order to ascertain whether in this process access of air exercised an essential influence upon the weight of the extract parallel experiments were made in which 25 c.c. of wine were placed in each of two platinum boats, enclosed in test-tubes, and arranged so that whilst side by side in the above-mentioned drying chamber a current of dried coal gas could be passed over one and a current of dried air over the other. A thermometer fixed in the drying chest showed that when the water was boiling vigorously the temperature in the interior was 100° C. After heating for eight and ten hours the residue was weighed with the following results:—

	Eight hours.	Ten hours.
Current of coal gas .	1·84 per cent.	1·80 per cent.
Current of air . .	1·90 ,,	1·86 ,,

The difference between the results of the two estimations is probably due to the extractive matter in the one case taking up oxygen from the air; but it is not considered sufficient to constitute an essentially larger quantitative result in drying under access of air than in a current of coal gas.

If the wine be first evaporated upon a water-bath in an open platinum dish to a syrupy consistence it only requires to be heated for three hours in the drying chest before reaching a point where the difference between two weighings is dependent entirely upon the volatility of the glycerine. Experiments made to determine the extent of this volatility showed that it amounted to about 10 per cent. of the glycerine present during the evaporation on the water-bath and another 4 per cent. in the drying chest. So that a wine containing 1 per cent. of glycerine would lose about 0·14 per cent. through its volatilization during evaporation and drying; but in a low wine, which with 5 or 6 per cent. of alcohol would probably contain only 0·4 per cent. of glycerine, the loss would only amount to 0·05 per cent. If, however, the extract be dried at 110° C., experiment has shown that in this part of the operation alone, in three hours, about 10 per cent. of the glycerine present is driven off, so that at the end of the drying the total loss is considerably larger than in drying at 100° C.

Alteration in the other constituents of the extract is relatively small when the drying is effected at 100° C. Fifty c.c. of wine, containing 0·47 total acids, was evaporated to the consistence of a syrup, then heated further for half an hour upon a water-bath, after which the non-volatile acid amounted to 0·36 per cent. The extract of the same wine after drying three hours at 100° showed upon titration 0·28 per cent.; that dried at 110° C. showed 0·22 per cent.; and that dried at 120° C. 0·11 per cent. of non-volatile acid.

Grete has recommended that in order to obviate the decomposition of the non-volatile constituents of the extract during drying, and especially to entirely prevent volatilization of glycerine, the wine should be evaporated with a measured quantity of titrated baryta water. Some experiments have been made by the authors to determine (1) whether an indifferent body like glycerine actually enters into chemical combination with caustic baryta so as to be no longer volatile at 110° C.; and (2) whether, if this be the case, the quantity of extract usually present in 10 c.c. of wine is sufficient to combine chemically with the whole of the baryta in 10 to 15 c.c. of baryta water of ordinary strength, so that in the dry residue no barium hydrate shall be present, since the reckoning of a variable amount of it as BaO would affect the result. An Alsace wine of 1876 was used, and it was found that the first of these questions must be answered in the affirmative, 0·489 per cent. out of 0·5 per cent. of added glycerine being recovered. As to the second, it was found that when 10 c.c. of baryta water was used it was certainly all combined, and that this was also the case with 15 c.c., unless the wine was particularly poor in extract. The partial decomposition of the nitrogenous organic constituents, which is made evident by the odour of trimethylamine when the extract containing baryta is heated, does not appear to exercise any essential influence upon the weight of the extract, whilst the acids of the wine, in the form of barium salts, better resist decomposition at a high temperature than in the free state.

This method has, however, the disadvantage that the same wine would be made to appear considerably richer in extract by the presence of traces of acetic acid, because whilst this would have been produced from the alcohol, it would be weighed with the extract. But the purpose of the adulterator, who had added glycerine to make up for the want of extract in a wine which had been diluted before fermentation with alcohol and water or sugar and water, would be thus served, as the extract would be brought up to the normal quantity, whilst in external characters the extract containing baryta from a diluted

* Abstract of a paper in Fresenius's *Zeitschrift für analytische Chemie*, xxi., 43.

wine that has been treated with glycerine does not differ from that of a natural wine. In practice, therefore, in many cases an estimation of the acetic acid and glycerine would also be necessary. As previously mentioned, by far the greater portion of the glycerine present in wine is retained in the extract. A wine, therefore, to which any considerable quantity of glycerine had been added would yield an extract that is soft and viscous even after three hours' drying, whilst the extract from a natural wine is hard and generally bulky and blistered, or at the most,—where the wine is strongly alcoholic through fermentation, which increases the normal quantity of glycerine,—is plastic, somewhat like hard dough.

Hager has compiled a table* by the help of which the amount of extract in a wine can be ascertained from the specific gravity of the liquid after being deprived of alcohol. In almost all the completely normal wines the quantity of extract found by the above method corresponded within two to three hundredths per cent. to that indicated by Hager's table. If the wine contains sugar still unfermented, or unfermentable constituents of potato sugar, then usually the extract calculated is somewhat higher than what is found; but if, on the contrary, it contains an abnormal quantity of glycerine the extract calculated is considerably less than what is actually found. Therefore, it is always advantageous to compare the amount of extract calculated according to Hager's tables with that found by the method described. This method does not do away with the necessity for an estimation of the glycerine itself in such wines as may be suspected to have received an addition of glycerine.

The authors have applied this method in the estimation of the extract of several hundred kinds of undoubtedly genuine wines of different years and from widely separated districts. The results of these determinations are set out in a tabular form in a separate communication.† It was found that the absolute quantity of extract in pure natural wines may vary within very wide limits. Among other conditions exercising an essential influence upon it are the nature of the soil of the district in which the wine is grown, the situation of the particular vineyard, the weather, degree of ripeness of the grapes, the course of the fermentation, and unskilful treatment of the wine, which may induce a considerable alteration in the composition of the extract without any foreign addition being made.

The amount of extract present in pure, completely fermented wine stands in definite relation to the acid present. It amounted in none of the genuine wines examined by the authors, after the deduction of the free acid of the wine, to less than 1 per cent. It may happen that a genuine wine may contain less than 1 per cent. of extract free from acid; but in such cases the *non-volatile* acid is determined, and after deducting this fixed acid from the total extract there is always a residue amounting to at least 1·1 per cent. The estimation of the fixed acid is made with sufficient exactitude by evaporating 20 c.c. of the wine to a syrupy consistence, heating it further for half an hour to an hour on a water-bath, subsequently treating it with hot water and titrating after it has cooled.

But a larger proportion of extract than 1 per cent. after deduction of total acids may be expected—

(1) In wines which contain much sugar still unfermented, but in which from any cause fermentation is stopped. The fully fermented dry wines usually still contain a small quantity of sugar, which may vary between 0·01 and 0·001 per cent. The minimum of extract free from acid to be expected in a natural wine would exceed 1 per cent. by as much as the quantity of sugar as ascertained under suitable precautions by means of Fehling's solution exceeds 0·1 per cent.

(2) In wines from certain districts which are known by experience to produce in their best years a relatively full-bodied wine.

(3) In red wines. In these the smallest amount of acid-free extract is usually 1·2 per cent.; but in "berry wines," and in such red wines as have stood only for a very short time over the husks and stalks, the minimum is exceptionally 1 per cent.

Wines rich in ash also stand higher in respect to amount of extract. If a wine yields much ash and gives relatively little extract, and if in addition the ash is easily fusible and not blackened by incineration, then the authors thinks there is reason to suspect that the wine consists partially of the product of fermentation of a solution of sugar over wine residues.

Provided that the total amount of extract, free from ash and sugar, does not sink below a certain quantity, it may vary very considerably in composition according to the quality of the wine. For instance, since glycerine is a bye-product of fermentation, and may amount to from 7 to 10 per cent. of the weight of alcohol produced, a clear natural wine, rich in alcohol, would evidently contain more glycerine than one poor in alcohol. Another portion of wine extract consists of pectin bodies, which occur, however, in less quantity in proportion to the ripeness of the grapes used in making the wine. Very ripe grapes, rich in sugar, leave after fermentation relatively much glycerine and little pectin substance, while with unripe, very acid grapes, poor in sugar, the contrary is the case.

The ash constituents amount on the average to about 10 per cent. of the entire weight of the extract, but this amount is not an indispensable characteristic of a pure wine, since it may be affected by various conditions. For instance, a wine may be rich in extract, but not in ash, when it contains a considerable quantity of unfermented sugar; or the ash may be low through separation of tartar not only when a wine contains much alcoool, but when it has been exposed for a long time to a low temperature, which causes a separation of the tartar in crystals that do not redissolve on the normal temperature being restored. The total amount of ash found by the authors in genuine wines did not fall below 0·14 per cent.

II. A Modification of Neubauer's Test for Potato Sugar in Wine, and the Optical Behaviour of Pure and Saccharated Wines.

Neubauer's method for the recognition of an addition of potato sugar to wine or must is based upon the optical behaviour of the wine in a polarimeter. Whilst pure natural wine, which contains unfermented fruit sugar, rotates the plane of polarized light to the left, and completely fermented wine is quite neutral in its behaviour or rotates the plane only a few tenths of a degree of Wild's scale to the right, a fermented potato solution has a considerable residue of strongly dextrogyre constituents, which are not sugar. According to recent experiments by the authors with various kinds of commercial potato sugar, even the best qualities, pure white and in crystalline granules, contain from 15 to 18 per cent. of unfermentable substance, each 1 per cent. of which, in 200 mm. tubes, has a dextrogyre action of 1·5° (Wild). Consequently 1° of rotation by the fermented wine due to this cause would, on the average, correspond to an addition of 4 kilos of potato sugar to the hectolitre of wine. In the presence of unfermented sugar this result would be modified: 1 per cent. of sugar rotates about 1·25° to the right, so that 1° of rotation, due to unfermented potato sugar, would correspond to about 800 grams of chemically pure grape sugar in the hectolitre. But inferior kinds of potato sugar contain from 26 to 30 per cent. of the unfermentable substances, which do not reduce Fehling's solution.

As before mentioned, wine frequently contains a small quantity of a dextrine-like constituent, capable of exercising a slight dextrogyre action amounting to 0·03° to 0·6° (Wild). But this substance is almost completely

* *Zeitschrift f. analyt. Chemie*, xvii., 502.
† *Zeitschrift f. analyt. Chemie*, xxi., 198.

insoluble in alcohol, whilst the greater portion of the dextrogyre residue from fermented potato sugar is soluble in 90° alcohol. Upon this fact Neubauer based a method of distinguishing between the slight dextrogyre action of a normal wine and that of one containing potato sugar. The method, however, has the defect of admitting the possibility of the result being affected by the presence in the test solution of free tartaric acid, which also has a dextrogyre action. It is, therefore, proposed by the authors to modify it as follows:—

210 c.c. of wine, after the addition of a few drops of concentrated solution of potassium acetate, is evaporated to a thin syrup, treated with 90° alcohol, the alcoholic solution decanted when perfectly clear or filtered, water added, and the liquid decolorized with animal charcoal, evaporated to about 15 c.c., filtered, the filter washed and the filtrate brought up to 30 c.c. (one-seventh of the original volume of the wine) and polarized. If the resulting liquid shows a rotation of more than 0·6° (Wild), the wine may be considered with certainty to contain potato sugar.

If a wine contain non-inverted and unfermented cane sugar, which would probably have been added to it after fermentation to increase the amount of extract, the dextrogyre action of such a wine would be changed into a levogyre action during the evaporation even by the influence of the natural acids, but more certainly if a few drops of hydrochloric acid be added. The presence of unfermented cane sugar would therefore be indicated when a wine first shows a dextrogyre action and then after evaporation with hydrochloric acid shows a corresponding levogyre action.

A 6·5 per cent. solution of cane sugar, which rotated 8·4° to the right, was heated in a water-bath during three-quarters of an hour with some hydrochloric acid, brought to its original volume and polarized, when it showed a left-handed rotation of 2·2°. In order to test whether the inversion was quite completed, this solution was now kept in active ebullition for half an hour, evaporated water being restored as far as possible; it had then acquired, without any perceptible charring, a wine yellow colour, and having been brought to its original volume, showed a left-handed rotation of 1·7°. A sugar determination with Fehling's solution gave 5 per cent. of invert sugar. It follows that a 1 per cent. aqueous solution of invert sugar rotates about 0·34° to the left (1 per cent. cane-sugar solution rotates about 1·3° to the right); that the inversion of a tolerably large amount of sugar is completely effected in three-quarters of an hour on the water-bath; and that by longer heating to a little over 100° C. (*i.e.*, to the boiling point of the sugar solution) a portion of the resulting invert sugar is again decomposed. When small quantities of cane sugar are present the natural acids of the wine are sufficient to effect complete inversion during heating; but with larger quantities (1 per cent. and upwards) it must be assisted by a little hydrochloric acid. As soon as cane sugar in wine has completely fermented its addition to the must can no longer be detected by optical means.

The question whether an addition of caramel to a wine exercises any influence upon its optical behaviour has been answered in the negative by the authors' experiments, caramel proving to be optically inactive.

III. Chlorine Determination and the Amount of Chlorine in Wine.

It is known that in the estimation of wine by experts an essential value is placed, among other things, upon the amount of ash found in it, and that manipulations for increasing its bulk considerably lower the proportion of incombustible substances that it yields. In order to cover this poverty of ash constituents an addition is often made of such salts as will remain completely dissolved in the wine and hence not raise suspicions, and for this purpose an addition of common salt to a sophisticated wine is not very extraordinary. But it is more common to use water from a spring rich in residual matter, by which means the lowering of the ash constituents through dilution of the wine is much lessened. Such waters, however, are often very rich in chlorine compounds, and therefore the estimation of chlorine in wines is not unfrequently of especial interest. But isinglass occasionally, though not very often, contains some added salt, so that the presence of a sophistication cannot be assumed with certainty upon the single ground of the occurrence of a somewhat too large quantity of salt.

All wines that contain abnormal quantities of common salt are distinguished by the ash not burning white so easily as that of most other wines: it pertinaciously retains carbon, and upon using a very strong heat in incinerating it probably fuses and a large portion of the alkaline constituents is volatilized. If the incineration residue be left to cool, treated with water so as to separate the salt from the carbonaceous particles, and then heated carefully so as to avoid spirting (a characteristic of common salt), a pure white ash will probably be obtained, but it will not contain all the salt. Further, if the extract be simply carbonized and then treated with water, the residue from the evaporation of the liquor cannot be looked upon as containing all the sodium chloride as such; because the organic acids of the wine, immediately upon being heated, and before they are decomposed, expel a considerable quantity of hydrochloric acid and eventually form carbonates. Consequently a chlorine determination of ash produced as carefully as possible gives the amount of chlorine compounds in a wine too low.

In the estimation of chlorine in original wines those quantitative analytical methods which depend upon the use of potassium chromate as an indicator are not available, because the red-brown silver chromate is not insoluble in the free acids of wine. The previous neutralization of the wine results in the production of colour during the reaction, which prevents the commencement of the end reaction from being distinguished with the necessary sharpness.

In using Volhard's method of determining chlorine white wine must be first decolorized with animal charcoal free from chlorine compounds, as the yellow tannin-like substances of the wine will produce with the ferric salt used as an indicator an intensely dark green or black colour, and even by this decolorization the production of colour in the wine upon the addition of ferric salts, silver solution and potassium sulphocyanide cannot be entirely avoided.

A slight modification of Volhard's method induces a sharp end reaction and gives exact results. 40 to 50 c.c. of decolorized wine is acidulated with nitric acid and treated with excess of titrated silver solution, and titrated solution of potassium sulphocyanide added gradually, until a drop of the liquid allowed to fall into a drop of dilute solution of a ferric salt (iron alum) upon white porcelain shows a distinct red colour. If the quantity of potassium sulphocyanide solution required be large, the experiment should be repeated, taking as small an excess of silver solution as possible. Twenty-five undoubtedly genuine wines from different districts (including five red wines) were examined for chlorine, and it was found that the normal amount of chlorine in wine does not exceed 0·005 per cent., whilst in most wines it is below 0·002 per cent. Five genuine "Markgräfler" wines, of the years 1822, '62, '68, '70 and '75, showed an amount of chlorine varying between 0·002 and 0·0025 per cent. Italian and similar wines, grown in the neighbourhood of the sea-coast, frequently yield an easily fusible ash that does not burn perfectly white; but none have yet been observed in which the amount of chlorine exceeded 0·006 per cent. At Carlsruhe several wines have been examined in which the chlorine amounted to 0·03 per cent., representing 0·05 per cent. of common salt, or 25 per cent. of the entire ash.

IV. Detection of Free Tartaric Acid in Wine.

If 100 c.c. of wine be evaporated to a thin syrup, and this, while kept stirred, be treated with strong alcohol until a fresh addition of spirit no longer causes precipitation, all the tartar will separate within two hours and the alcoholic solution will contain the free tartaric acid. The alcohol is evaporated, the residue taken up with water, the somewhat turbid liquid cleared by the addition of pure washed animal charcoal,* filtered, and the filtrate, which may amount in volume to one-tenth of the original wine, treated cold with 1·5 to 2 c.c. of a 20 per cent. solution of acetate of lime. A wine, which tested according to Berthelot and Fleurieu's method is found to contain no free tartaric acid, does not show the slightest turbidity when treated in the above manner. Wines containing 0·05 per cent. of free tartaric acid show after a short time a crystalline separation, and after half an hour a distinctly crystalline granular deposit on the sides and bottom of the containing vessel; in two hours the separation is considerable, after which it does not perceptibly increase. An amount equal to 0·01 per cent. gave in two hours distinct crystals of tartrate of lime. The presence, however, of so small a quantity of free tartaric acid is of little consequence in judging a wine. Wines from unripe or partially unripe grapes contain free tartaric acid; but according to the results of experiments on wines from most diverse districts it never exceeds one-sixth of the non-volatile acids present.

V. Estimation of Citric Acid in Wine.

Citric acid is sometimes used as an addition to the acid in an excessively diluted wine, either in substance, or, if it be desired to give to the beverage at the same time body and the appearance of old wine, in the form of tamarinds, in which it is present in considerable quantity. The estimation of citric acid in wine has therefore considerable interest.

For the detection of citric acid the characteristic behaviour of its lime salt can be used, it separating in a crystalline form upon prolonged boiling of the aqueous solution; but the citric acid must previously be separated as much as possible from other acids and the special extract constituents of the wine, since citrate of lime remains dissolved in the neutral saline solutions of most acids. After many unsuccessful experiments the following method was found to give useful results.

100 c.c. of wine being evaporated to about 7 c.c., it is allowed to cool and then treated with 80 per cent. alcohol; after standing about an hour the undissolved matter is removed by filtration, the alcohol evaporated off, water added to bring the residue up to 20 c.c., part of the acid neutralized with a thinnish milk of lime (red wine requires here an addition of some washed animal charcoal), and then filtered. The filtrate, which must still be distinctly acid, is brought up to the original volume of the wine with water, and 0·5 to 1 c.c. of a cold saturated solution of neutral acetate of lead added and very briskly agitated. The lead precipitate contains a portion of the malic acid (another portion remains dissolved as an acid salt in the dilute acid liquid), phosphoric acid, a trace of sulphuric acid, tartaric acid and citric acid. It is filtered off, washed with cold water, placed together with the filter in a closed retort containing water saturated with sulphuretted hydrogen and energetically shaken and thus decomposed. After standing some time the perfectly colourless, clear liquid, which contains the above-mentioned acids, is filtered off, washed with water containing sulphuretted hydrogen, the sulphuretted hydrogen driven off by evaporation, and the liquid, amounting to about 15 c.c., made faintly alkaline with thin milk of lime, so as to separate phosphoric acid, then filtered, the filtrate acidulated with the smallest possible quantity of acetic acid, and by standing from half to one hour the tartaric acid present sufficiently removed as tartrate of lime. The liquid is then evaporated to dryness to separate free acetic acid, the residue taken up with hot water and this concentrated until the separation of the crystalline citrate of lime. After being once separated it is no longer soluble in hot water; it is filtered off, washed hot, dried and weighed. The salt has the composition $(C_6H_5O_7)_2Ca_3 + 4H_2O$. In this way, in a case where 20 mg. of citric acid had been added to a wine a precipitate corresponding to 13 mg. of citric acid was obtained.

In a specimen of commercial tamarinds 13·5 per cent. of citric acid was found.

Most of the natural wines tested were found to be free from citric acid. Some of them contained traces; as, for instance, a white Alsace wine of 1878 and a white Italian wine of 1880. But the amounts of citric acid in these wines only amounted to between 0·003 and 0·002 per cent.

* The charcoal must be boiled with hydrochloric acid and washed so that whilst moist it shall have a perfectly neutral reaction, and contain scarcely any salts, especially phosphate.

EXAMINATION OF THE ROOT OF BERBERIS AQUIFOLIUM—VARIETY REPENS—OREGON GRAPE ROOT.*

BY HENRY B. PARSONS.

This plant is found in the mountainous regions of Oregon, California, Utah, Colorado, Nevada and Montana, from which latter section the sample here examined was received.

The roots, as received, were in broken pieces, about a foot in length and ¼ inch in diameter; they had a brownish exterior layer, underneath which was a bright yellow layer. The powdered sample has a bright lemon-yellow colour and a decidedly bitter taste.

The root is said to be much used in form of decoction for the treatment of what is known as the "mountain fever" among the western miners. By them it is reported to be an efficient tonic and antiperiodic, capable of replacing salts of quinia in the treatment of malarial disorders.

In 1837, a French physician, Piorry,† stated that he preferred a properly made extract of the root of *Berberis vulgaris* (a closely related plant) to quinia salts in all diseases where "he found the spleen enlarged in a patient suffering from ague, intermittent, or hectic." Some years later, his former pupil, Dr. L. M. Klein, made further experiments in treatment of fevers in Algeria, and he strongly confirmed the statements of Piorry. As the root of *Berberis vulgaris* (the common "barberry" of the Eastern States) is very similar in composition to the root of *Berberis aquifolium*, variety *repens*, the therapeutic action of the two is likely to be about the same, and the statements based on trials of the one are probably applicable to the other. Be this as it may, the fact remains that recent trials in the United States seem to show that the tonic properties of *Berberis aquifolium* are unquestionable, and eclectic practitioners have long claimed that its antiperiodic virtues were equally well defined and established.

A careful chemical analysis of the powdered roots reveals the presence of two alkaloids, to which, in all probability, can be ascribed the medicinal effects of the roots. None of the other substances were of a character likely to have any decided activity.

The first alkaloid, *berberina*, is the substance to which the yellow colour of the root is due; it is freely soluble in alcohol, moderately soluble in water and in chloroform and ether. Its taste is decidedly bitter. It forms sparingly soluble lemon or orange-yellow salts with sulphuric, hydrochloric and nitric acids, and salts more freely soluble with acetic, phosphoric and hypophosphorous acids.

* Report of the United States Commissioner of Agriculture, for 1880, p. 139. From *New Remedies*, March, 1882.

† *Lancet*, 1872, December 5, p. 498.

	Properties and Reactions.	Berberina.	Hydrastina.	Oxyacanthina.
		$C_{20}H_{17}O_4$	$C_{22}H_{23}NO_6$ (?)	$C_{16}H_{23}NO_6$(?). $C_{32}H_{46}N_2O_{11}$ (?).
1	Colour	Lemon or orange	Pure white	White; yellowish, on exposure.
2	Taste	Bitter	Nearly tasteless	Bittter.
3	Water	Moderately soluble	Insoluble	Nearly insoluble.
4	Absolute alcohol	Moderately soluble	Soluble	Soluble.
5	Commercial 90 per cent. alcohol	Soluble	Soluble	30 cold; 1 boiling.
6	Ether	Nearly insoluble	Soluble	125 cold; 4 boiling.
7	Chloroform	Moderately soluble	Soluble	Freely soluble.
8	Benzole	Nearly insoluble	Soluble	Soluble.
9	Ammonia	Soluble	Insoluble	Sparingly soluble.
10	Soda	Soluble	Insoluble	Moderately soluble.
11	Sodium carbonate	Soluble	Insoluble	Nearly insoluble.
12	Tinct. iodine	Dark red precipitate	Dark red precipitate	Dark brown-red precipitate.
13	Iodine in iodide	Nearly black precipitate	Nearly black precipitate	Dark brown-red precipitate.
14	Potas. merc. iodide	Yellow precipitate	Yellow precipitate	Yellowish precipitate.
15	Phosphomolybdic acid	Yellow precipitate, soluble in ammonia.	Brownish precipitate: not soluble in ammonia	Brownish precipitate, insoluble in but turned dark-blue by NH_4OH.
16	Potas. cadmium iodide	Yellow precipitate	White precipitate	White precipitate.
17	Picric acid	Yellow precipitate, insoluble in dilute HCl.	Yellow precipitate, insoluble in acetic acid	Yellow precipitate, insoluble in acetic acid.
18	Platinum chloride	Yellow precipitate, soluble in HCl.	Yellowish precipitate, soluble in HCl	Yellowish precipitate, insoluble in HCl.
19	Gold chloride	Yellow precipitate, insoluble in HCl.	Yellow precipitate, insoluble in HCl.	Orange precipitate, insoluble in HCl.
20	Tannic acid	Yellow precipitate, insoluble in HCl or $HC_2H_3O_2$.	Brownish precipitate, soluble in $HC_2H_3O_2$, but insoluble in HCl.	Brownish precipitate, insoluble in $HC_2H_3O_2$ and dilute HCl.
21	Conc. sulphuric acid	Yellowish-red, olive-green, brown, olive-brown	Yellow, purple-brown, green	Brownish-purple, browner, more purple on standing.
22	Sulphuric and molybdic acids	Yellow-brown, olive-green; same warmed.	Deep green, brick-red, red-brown, dark chocolate-brown	Purple; fades slowly; becomes yellow, then green.
23	Conc. nitric acid	Orange-red; no effervescence	Orange-red; effervesces; brown and darker	Orange-red; effervesces; colour permanent.
24	Fused zinc chloride	Yellow; light-brown	Light yellowish-brown	Chocolate-brown.
25	Specific rotatory power		+153·5 (in excess dilute HCl).	

This alkaloid is removed from the plant by water; much more readily, if a little acetic acid is added.

The alkaloid and its salts have been used as a tonic, and as an antiperiodic, and glycerin solutions of the alkaloid are still considerably employed in treatment of ulcerated surfaces.

The second alkaloid is called "*oxyacanthina*;" it is a white, bitter, difficultly crystallizable solid, which changes to a light yellow colour if it is long exposed to the air in a moist condition. The presence of a little caustic or carbonated alkali seems to intensify this colour, and may possibly cause the change. If this alkaloid be treated with dilute nitric acid in excess, and slightly warmed, it gives off nitrous vapours, and is converted partly into a yellowish-red resin-like substance, and a soluble substance much resembling berberina in colour, and precipitated by Mayer's solution. It may be possible that this alkaloid is closely related to berberina; a similar action occurs with hydrastina.

There seem to be no statements regarding the medicinal properties of oxyacanthina. As it is easily prepared, the matter might readily be investigated. It may be separated from the mother-liquors, after berberina has been crystallized from extracts of *Berberis aquifolium* or *B. vulgaris*, by adding a very slight excess of sodium carbonate solution with constant stirring. The yellowish precipitate should be allowed to separate; it can then be washed on the filter until nearly free from berberina, dissolved in dilute hydrochloric acid, and again precipitated by careful addition of ammonia. After washing and drying the substance is moderately pure. It may be further purified by crystallization from alcohol. It cannot be crystallized from chloroform alone.

The other chemical properties of these two alkaloids are given in the above table.

The yellow alkaloid, berberina, is geographically very widely distributed, plants containing it having been found growing in Europe, Asia, Africa and America. It is also found, probably, in more natural orders, and also in more distinct plants, than any other alkaloid; possibly caffeina may prove an exception.

Of the natural orders, it has been found in *Ranunculaceæ*, *Anonaceæ*, *Menispermaceæ*, *Berberidaceæ*, *Rutaceæ*, and *Leguminosæ*. The first five of the above natural orders are closely related, and it may prove that the presence of berberina, together with certain other alkaloids, may be of service in the identification and classifition of doubtful botanical specimens. Thus it is at present possible to distinguish chemically between the root of *Hydrastis canadensis* (nat. ord. *Ranunculaceæ*) and the root of *Berberis aquifolium* or *B. vulgaris* (nat. ord. *Berberidaceæ*); for while both plants contain berberina, still this yellow alkaloid is associated in hydrastis with a white alkaloid (hydrastina), which gives quite different chemical reactions from the white alkaloid of berberis (oxyacanthina). A more complete study of this question would be of scientific and practical interest.

The following is a proximate analysis of the roots:

Proximate Analysis of the roots of Berberis Aquifolium, variety repens. "Oregon Grape Root."

Moisture		6·08
Ash, soluble in water	1·63	
Ash, insoluble in water	2·08	
		3·71
Crude fibre		23·33
Albuminoids, insoluble in water and alcohol	3·15	
Albuminoids, soluble in alcohol, insoluble in water	1·68	
		4·83
Berberina*		2·35
Oxyacanthina*		2·82
Black substance with oxyacanthina		0·23
Resin, insoluble in ether, soluble in alcohol		1·91
Sugars (traces), organic acids (?), extractives, colours		4·55
Ether extract, chiefly wax		1·36
Gum and yellowish colour		5·56
Starch isomers, by titration		18·05
Substances extracted by acid and alkali, determined by difference		25·22
		100·00

In the table on the previous page are given some of the properties and characteristic reactions of these three alkaloids. It will be seen that the different solubilities of the platinum salts (18) and of the tannate (20) and the strikingly different colour reactions, especially with sulphuric and molybdic acids (Fröhde's reagent), (22), serve to make the distinction between hydrastina and oxyacanthina comparatively easy and certain. Lack of material and of time prevented further chemical investigation of oxyacanthina.

TAPIOCA CULTIVATION IN MALACCA.†

The mode of cultivating tapioca in the Straits varies but little on different estates, whether owned by Europeans or Chinese. If jungle composed of large trees is to be cleared the trees are cut down at some height from the ground, the stumps remaining in the ground, and the whole set on fire, the charred remains of the trees being generally allowed to lie where they fall until the first crop is being cleared off, when they are utilized for fuel. After the ground has been dug over and the soil put into a friable condition the cuttings of tapioca are planted in rows from 3 to 4 feet apart and about 9 inches or a foot in the rows. The cuttings are lengths about a foot long of the stem of the matured plant. These root easily, and in less than two months the ground is covered with a carpet of green almost a foot high. From this time to the time the crop is lifted, beyond weeding and slightly banking-up, nothing is done to the crop, although on some estates the tall stems are sometimes cut down to about 4 feet from the ground, which must evidently keep the plants in a growing state, and prevent the proper storage of starch. On some estates I have known the crop lifted nine months after planting, with good results; but the Chinese planters in Malacca usually keep the roots in the ground sixteen or even eighteen months. Perhaps each has its advantages, but it has struck me that tubers kept in the ground over a year develope a large amount of woody fibre without increasing the quantity of starch, which is evidently a disadvantage to the machinery. The general mode of lifting the crop is to cut off a certain portion of the tops, and pull up the tubers, the broken pieces being dug out afterwards. Of course, on land that has previously carried a tapioca crop, manure should be used, which by some planters is applied previous to planting, and by others after the young plants have started into growth. In Malacca, however, cow-shed refuse is a scarce article, and the cost of carriage would be considerable where estates are distant from the base of supply and roads in many instances steep and bad.

On one estate in Singapore under European management a green crop is grown with the tapioca, consisting principally of *Arachis hypogœa*, various crotalarias, principally *C. striata*, etc., which is dug in with lime, etc., while green, for the next crops, but the plan does not appear to find acceptance with other planters. The root of the tapioca it is hardly necessary to describe here, but I may state that while in Malacca I saw some specimens over 2 feet long, and weighing between 6 and 7 lbs. The roots being laid in heaps are carted to the manufactory, and the sticks laid in stacks for supplying cuttings for the next crop.

The estate first visited in Malacca was Buki Bruang (literally Bear Hill), and here we found J. M. Lyon and Co's patent machinery in full working order.

Of course steam is the motive power, in fact the most primitive styles of preparation seem unable to do without this, as I will show later on. The roots, being first divested of their woody tops, are thrown into a large revolving drum, in which pipes are so arranged that constant jets of water play on them as they are turned over and over, and gradually they reach the farther end of the drum perfectly clean, and empty themselves into a rasping machine, whence they emerge in the form of a fine pulp, which is thrown direct from the rasper into another cylinder covered either with stout muslin or brass-wire gauze, through the sides of which jets of water are continually passing. By this process the starch is separated from the pulp, the starch passing through the muslin or gauze into a tank beneath, where further supplies of water send it off through gutters to vats prepared for its reception, while the pulp is discharged from the drum into baskets and thrown into heaps either for cattle feeding or manure, for either of which I imagine it is little suited.

After the starch in the vats has been allowed to subside the water is gradually drawn off, fresh water supplied, the whole stirred up and again allowed to subside, and the water again drawn off. The treatment of the starch in this stage depends on the purity of the water used—as, unless the tapioca when prepared is of the purest whiteness it can hardly be given away. Hence, one of the principal points to be attended to is the supply of clean water in abundance. After the starch has become sufficiently pure it is allowed to dry in the vats, whence it is cut out in cakes and is then ready for the last stages of preparation. If tapioca flour is required it is placed first on racks to dry, then on large, almost flat tin sheets which form the top of a brick flue where an extremely gentle fire is kept up.

If flake tapioca is requisite it is submitted to rather stronger heat in concave pans at first, whence it is removed to the previously mentioned sheets and kept turned over with wooden rakes, etc., until it assumes the flake-like form so familiar to consumers in Europe. The flakes are then sifted, to separate the various sizes, and the prepared tapioca is ready for placing in the bags for shipment.

Next morning at 6 o'clock we were *en route* to another estate, belonging to Mr. Koh Hoon Boh, at Matchap, about eighteen miles distant. The first ten miles is along the public road, along some parts of which in wet situations are large indigenous plantations of the glam (*Melaleuca leucodendron*), the bark of which is used by Malays for caulking their boats. In all directions we saw the natives busy planting the rice fields,

* The figures of berberina and oxyacanthina are probably a little too low, owing to the sparing solubility of the alkaloids or compounds which were weighed. The error does not probably exceed 0·1 per cent. in either case, and is probably least for berberina, which was weighed as platinum salt. The oxyacanthina was weighed as base.

† Extract from a communication to the *Gardeners' Chronicle*, June 17, 1882.

On leaving the public road, however, our troubles began; to drive over the road we did the day before was a delight compared with the one it now fell to our lot to drive over, and it was with no little satisfaction that I gave up the reins at Matchap to the syce, after his informing me when within fifty yards of the house that I had two miles more to drive. Here we found the primitive style at work. The roots are first half-peeled with knives, in which operation a large part of the root is cut off, then thrown into a tank of water, when they are washed by the Chinese treading on them; thence they are lifted in baskets to the rasping machine, which is worked by a traction engine, built in the brickwork, and regulated by hand. The pulp falls from the rasper into baskets, which are carried about twenty yards, and the contents emptied on muslin covers of concave wickerwork baskets, above which a wooden water gutter is placed, the supply of water being regulated by plugs over the baskets. Here the Chinamen separate the starch by arranging a constant fall of water on the muslin, and keeping the mass well stirred with their hands until they think they have extracted all the starch, when they throw the refuse pulp away, and receive a fresh supply from the rasper, the water with which they wash the pulp serving to convey the starch to vats prepared for it. Of course the starch prepared in this manner requires more washing than that prepared by the machinery I have described, and I venture to think that consumers in England would prefer tapioca, made by machinery, when it need never be handled, to that which is carried about so much amongst decaying vegetable matter and mud, as that hand-prepared usually is. Here the starch is baked by fire passing beneath a tile-covered flue on which it is placed. Pearl tapioca is manufactured here as follows:—A cloth is attached like a hammock to the beams and kept open by cross sticks. A man at each end alternately jerks the cloth to and fro, the slightly warmed starch under this treatment soon forming small, completely spherical balls, which are afterwards baked on a tile covered flue.

The number of coolies about here was surprising, and it is hardly necessary to say that only about 30 piculs of tapioca is produced per diem; in fact, Mr. Koh Hoon Boh is so thoroughly convinced of the superiority of manufacture combined with economy of the preparation by machinery, after comparing the cost at his estate, which we visited the day before, with the cost of hand preparation, as at Matchap, that he ordered a machine to be erected at once.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 26.)

Sodii Salicylas (*Salicylate of Sodium*).

Salicylic acid, dialysed	33
Bicarbonate of sodium	20
Distilled water	q.s.

Mix the acid and bicarbonate in a porcelain capsule, with the least possible quantity of distilled water to a thick paste and heat the mixture, on the water-bath, to a temperature no exceeding 60° C. (140° F.). When no more carbonic acid gas escapes, ascertain if the solution has still a slight acid reaction, and, if this is the case, evaporate it to dryness, under constant stirring.

A white powder, crystalline or amorphous, soluble in 0·8 part of water and in 5 parts of strong alcohol.

Sanguis Bovinus Siccus (*Dried Ox-blood*).

Fresh ox-blood	q.s.

Free it, while still fresh, by beating, from the fibrin, strain and evaporate it, under continuous stirring, on the water-bath to dryness, at a temperature not exceeding 60° C. (140 F°.).

Preserve the powder in a well-stoppered bottle.

Sapo Guaiacinus (*Guaiac Soap*).

Guaiac	2
Potassa	1
Water	q.s.

Rub them together and add enough water, in drops, to produce a mass of a pilular consistence.

It should not be kept in stock.

Sapo Picis Liquidæ (*Tar Soap*).

Medicinal soap (Castile soap)	24
Carbonate of sodium, dried and powdered	2
Borate of sodium, powdered	1
Tar	8
Water	q.s.

Mix them together to a mass of a pilular consistence and divide it into pieces of suitable size.

Sapo Terebinthinæ Liquidus (*Liquid Turpentine Soap*). [Balsamum vitæ citrinum.]

Carbonate of sodium	3
Medicinal (Castile) soap	4
Oil of turpentine	6
Compound spirit of mastic	6
Compound spirit of juniper	6
Water	60

Heat the carbonate of sodium, soap, oil of turpentine and water for several hours on the water-bath, filter and add the spirits.

Compound Spirit of Mastic (*Pharm. Neerl.*) is prepared thus:—

Mastic	1
Olibanum	1
Myrrh	1
Amber	1
Stronger alcohol	10
Water	12

Distil them together until the distillate has a specific gravity of 0·873 to 0·878.

Compound Spirit of Juniper (*Pharm. Neerl.*):—

Juniper berries	3
Caraway	1
Fennel	1
Stronger alcohol	14
Water	30

Distil them together until the distillate has a specific gravity of 0·929 to 0·935.

Liquor Acidi Arsenici (*Solution of Arsenic Acid*).

Arsenious acid, powdered	4
Hydrochloric acid	1
Nitric acid	9
Distilled water	q.s.

Boil the acids together in a glass flask, until a portion of the liquid, after being neutralized with soda solution, is no longer rendered green by solution of bichromate of potassium.

Evaporate, on the water-bath, in a porcelain capsule, until acid vapours are no longer given off, and the liquid has a syrupy consistence.

Finally, add enough distilled water to obtain 80 parts of product.

The solution contains 5·75 per cent. of arsenic anhydride (As_2O_5).

Liquor Ferri Albuminatis (*Solution of Albuminate of Iron*). [Solutio Albuminatis Ferrici.]

Albuminate of iron	1
Hydrochloric acid	0·1
Distilled water, warm	100

Dissolve the albuminate of iron by aid of the acid in the water, and filter the solution, if necessary.

The product contains 0·033 per cent. of iron, and should be freshly prepared when wanted for use.

(For formula of Ferri albuminas, see vol. xii., p. 662).

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* From *New Remedies*, April, 1882.

LIQUOR HYDRARGYRI ALBUMINATIS (*Solution of Albuminate of Mercury.*

[Solutio Albuminatis Hydrargyrici.]

White of egg	32
Bichloride of mercury	1
Chloride of sodium	4
Distilled water	q.s.

Mix the white of egg thoroughly with 45 parts of distilled water; filter the mixture, and precipitate it by enough of a solution of the bichloride of mercury in 19 parts of distilled water, until a few drops of the liquid, when mixed with solution of carbonate of sodium, begins to assume a red colour.

Then add a solution of the chloride of sodium in 16 parts of distilled water, or as much thereof as may be required to redissolve the precipitate.

Dilute the mixture with distilled water to 100 parts.

Let it stand a few days, filter it, and preserve it in small, completely closed vials.

SAPO STIBIATUS (*Antimony Soap*).

Sulphide of antimony (Schlippe's salt)	1
Medicinal (Castile) soap	3
Water	3

Dissolve the sulphide of antimony in the water, add the soap and reduce the mass to a pilular consistence, by a gentle heat.

Whenever the mass assumes a red colour, on the water-bath, add a little solution of soda.

The soap should have an ash-grey colour, and be soluble in water. It should be kept in a well-stoppered bottle.

N.B.—Schlippe's salt is prepared as follows:—75 parts of carbonate of sodium (cryst.) are dissolved in 300 parts of water, heated to boiling and mixed with a milk of 26 parts of lime and 100 parts of water. After half an hour's boiling, 9 parts of sublimed sulphur and 36 parts of levigated sulphide of antimony are added, and the whole boiled until the grey colour has disappeared, when the liquid is filtered and crystallized. The salt has the composition: $Na_6Sb_2S_8.18H_2O$. It is a sulphantimoniate of sodium.

LIQUOR (BROMO-) ARSENICALIS CLEMENTIS (*Clement's Solution of Arsenic and Bromine*).

[Solutio Arsenicalis Clementis.]

Arsenious acid	1
Carbonate of potassium	1
Bromine	2
Distilled water	q.s.

Heat the arsenious acid with the carbonate of potassium and 10 parts of distilled water in a flask, until the acid is completely dissolved. When cold, add to it the bromine and enough distilled water to make the product weigh 100 parts.

LIQUOR ARSENICALIS ISNARDI (*Isnard's Solution of Arsenic*).

[Isnard's Water.]

Arsenious acid	1
Distilled water	q.s.

Dissolve the acid in 100 parts of distilled water, and dilute the solution with distilled water to 10,000 (ten thousand) parts.

LIQUOR CHLOROFORMI CUM MORPHIA (*Solution of Chloroform with Morphine*).

[Solutio Chloroformi cum Morphino.]

Morphine (alkaloid)	1
Acetic acid	q.s.
Stronger alcohol	20
Chloroform	80

Dissolve the morphine in just enough acetic acid at a gentle heat. Then add the alcohol and chloroform, and preserve the mixture in a well-stoppered bottle.

LIQUOR AMMONII CITRATIS (*Solution of Citrate of Ammonium*).

Citric acid	16
Water of ammonia	q.s.
Distilled water	q.s.

Dissolve the citric acid in 40 parts of distilled water; add enough water of ammonia to neutralize the solution (about 40 parts). Filter and dilute with enough distilled water to make the product weigh 100 parts.

The solution contains 20 per cent. of citrate of ammonium, and should be freshly prepared when wanted for use.

TINCTURA FERRI IODIDI (*Tincture of Iodide of Iron*).

[Solutio Iodeti Ferrosi Spirituosa.]

Iron, in powder	3
Iodine	8
Distilled water	q.s.
Stronger alcohol	q.s.

Mix the iron and iodine in a glass flask, with 20 parts of distilled water. When the mixture has acquired a bright green colour, filter it, wash the filter with a little strong alcohol, and add enough alcohol to the filtrate to make it weigh 100 parts.

The tincture contains 9·7 per cent. of ferrous iodide, and should be freshly prepared when wanted for use.

TINCTURA IODINII DECOLORATA (*Decolorized Tincture of Iodine*).

[Solutio Iodii Decolorata.]

Iodine	10
Hyposulphite of sodium	10
Spirit of ammonia	16
Distilled water	q.s.
Alcohol (stronger)	75

Digest the iodine with the hyposulphite and 10 parts of distilled water in a glass flask until all is dissolved. When cold, add the spirit of ammonia, shake a few minutes, and then add the alcohol. Let the mixture stand in a cool place until it has become colourless; then filter.

A clear, colourless liquid, of a peculiar ammoniacal odour, and a specific gravity of 0·940 to 0·945.

LIQUOR FERRI DIALYSATI (*Solution of Dialysed Iron*).

[Dialysed Iron.]

Solution of chloride of iron (ferric chloride), specific gravity 1·480–1·484	35
Water of ammonia (0·960)	20
Distilled water.	

Place the solution of chloride of iron in ice for fifteen minutes; then mix it gradually with the water of ammonia, previously cooled by ice. Stir the mixture, and when it has become clear again, pour it into a hog's bladder, previously cleansed by treatment with dilute solution of potassa and washing with water. Tie the bladder as close to the liquid contents as possible, and suspend it in a cylindrical glass containing five times the volume (of the bladder) of distilled water, so that the surface of the water is about 1 cm. above the top of the bladder.

Change the water, first every twelve, afterwards every twenty-four hours, and continue to do this until the water, when acidulated with nitric acid, is no longer rendered turbid by nitrate of silver. Then dilute the liquid in the bladder with distilled water until it has a specific gravity of 1·046.

The solution contains 5 per cent. of iron, is clear, has a dark brown colour, no odour, and scarcely any taste. It is miscible with strong alcohol, but on addition of an acid or an alkali, it separates a red-brown precipitate.

It should give no reaction either with ferricyanide of potassium or with nitrate of silver.

LIQUOR SODII CARBOLATIS (*Solution of Carbolate of Sodium*).

[Solutio Phenylatis Natrici.]

Carbolic acid	5
Solution of soda (specific gravity 1·330)	1
Distilled water	4

Mix them.

A clear liquid of an alkaline reaction, a specific gravity of 1·060 to 1·065, and miscible with water and alcohol in all proportions.

It should be freshly prepared when wanted for use.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JULY 15, 1882.

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

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROPOSED AMENDMENT OF THE WEIGHTS AND MEASURES ACT.

CONSIDERABLE inconvenience has been experienced in the working of the Weights and Measures Act, 1878, from the permissive character of the provisions in regard to the fees charged for verification and stamping, and the opportunity thus afforded for inequality in the charges made for this work. It is from the manufacturer's point of view highly desirable that, whatever charges are made for verification and stamping of weights and measures, there should be one uniform rate for the whole Kingdom. Probably it is from considerations of this kind that a Bill has been brought into Parliament by Major ROSS and Dr. CAMERON to amend the Weights and Measures Act, 1878. According to the official report of the votes and proceedings the Bill was read a second time on Wednesday evening and committed for Monday next, and as it deals with apothecaries' weights and measures, as well as those of other denominations, it will be well to recapitulate the amendments which it proposes to effect.

According to the forty-seventh section of the Act an inspector may take for verification and stamping any fees fixed for the time being by the local authorities appointing him, provided only that they do not exceed in amount those specified in a schedule appended to the Act. By the Bill now before the House of Commons it is proposed to repeal so much of the forty-seventh section as relates to the amount of the fees, also to replace the schedule in the Act by another scale of fees, and to enact that an inspector under the Act shall take in respect of the verification and stamping of weights and measures such fees and no other as shall be according to the scale contained in the new schedule.

The chief point of interest in this Bill for pharmacists is the introduction of a scale of fees for the verification and stamping of what are termed apothecaries' weights and measures. For each weight from ten ounces to one ounce inclusive the fee is to be twopence, and for each weight from four drachms to half a grain inclusive the fee is to be one penny. The fees for graduated measures are to be one shilling for each measure containing more than one hundred subdivisions; sixpence for each measure containing more than fifty and not more than one hundred subdivisions; fourpence for a measure containing between one and fifty subdivisions; threepence for each measure of forty fluid ounces to one fluid ounce respectively, and twopence for each separate measure of four fluid drachms to one minim. These fees will obviously add to the cost of the weights and measures referred to; but in view of the purposes to which they are applied, and the importance of accuracy for those purposes, it does not appear that the proposed fees would unreasonably augment the cost of the weights and measures used by pharmacists. In any case, however, it is desirable that a Bill of this nature should not pass unnoticed through it various stages and become law without due consideration.

THE BRITISH PHARMACEUTICAL CONFERENCE.

WITHIN six weeks from the present date, the period fixed for the meeting of the British Pharmaceutical Conference will have arrived, and it is not too soon to remind our readers that this year the Conference will hold its sittings at Southampton, under the presidency of Professor ATTFIELD. The course hitherto followed of associating this meeting with that of the British Association will again be adhered to, the Tuesday and Wednesday of the fourth week in August being the days fixed for conducting the ordinary business of the Conference. A circular is now in course of being issued by the Honorary General Secretaries to the members of the Conference, informing them of the arrangements that have been made, and requesting those who intend to be present to communicate with Mr. O. R. DAWSON, the Secretary of the Southampton Committee, to that effect, and for the purpose of making inquiries as to the local arrangements for lodgings, hotel accommodation and railway routes, etc. We understand that a room has been engaged at RADLEY'S Hotel for the general use of the members of the Conference, and that a limited number of beds have been secured in the same house for those who desire to be at the headquarters of the Conference. The business meetings will take place at the WATTS Memorial Hall.

One of the first points to be remembered is that intending contributors of papers are expected to send in their manuscripts to the General Secretaries ten days before the meeting takes place, accompanied with a short abstract for insertion in newspapers, and that the titles of their papers are to be forwarded two or three weeks before the meeting, addressed to the Secretary of the Conference, 17, Bloomsbury Square. It is important that this requirement should be attended to in order to admit of the subjects for discussion being brought under the notice of pharmacists beforehand, and thus to secure for them full interest.

The attractions presented by Southampton as a place of meeting are not equal to those of towns situated in the manufacturing districts of the

Midland counties and the North; but there are in the neighbourhood many objects of interest, both ancient and modern, which, together with the well-known natural beauties of Hampshire and the Isle of Wight, may be expected to excite a very general desire to take part in this year's Conference. The town itself possesses some remarkable antiquarian remains, notably the Bargate and portions of the wall which probably existed in the time of CANUTE, while the modern extension of the town beyond the old boundaries has the advantage of comprising a large area of public parks and finely wooded common land. Within a few miles of the town are the picturesque ruins of Netley Abbey, and close by is the Royal Victoria Military Hospital. At somewhat greater, but still easily accessible distances, are the New Forest, the Isle of Wight, the naval port and dockyard of Portsmouth, and the cathedral cities of Salisbury and Winchester, all presenting features of interest that are worthy of observation.

The works connected with Her Majesty's Ordnance Survey Office, where operations are carried on for the production of the ordnance maps, are situated at Southampton, and it is expected that the Local Committee will be able to obtain permission for the visitors to the Conference to inspect these works during their stay in Southampton.

The excursion which is a usual feature of the Conference gatherings will this year be by steamer to the Isle of Wight, on Thursday, the 24th August. On this occasion the visitors will have an opportunity of seeing Ryde and Ventnor and the remains of a Roman villa at Brading. If the weather should by that time have assumed a character more consistent with the summer season there is much reason for anticipating that this excursion will not form the least agreeable part of the proceedings at this year's Pharmaceutical Conference.

AMERICAN PHARMACEUTICAL ASSOCIATION.

A CIRCULAR has been issued notifying that the thirtieth annual meeting of the American Pharmaceutical Association will commence on Tuesday, September 12, at Niagara Falls, New York, and it is anticipated that the conditions under which the meeting is to be held will tend to make it one of the largest the Association has yet had. It is incidentally mentioned in the circular that the Association now numbers thirteen hundred members.

PROPRIETARY REMEDIES.

THE Connecticut Medical Society appears to have listened approvingly last month to a vigorous denunciation, by Professor LINDSLEY, of the patronage of proprietary remedies by the medical profession, which was described as destroying scientific nomenclature, rendering useless scientific pharmacy, and unfitting the physician to combine remedies. There was a disposition to make an exception in favour of preparations that could be best made on a large scale and elegant pharmaceutical preparations, even though protected by a trade mark. But there was an unsparing condemnation of the use of proprietary preparations having complicated and unknown formulæ, or representing such articles as a pharmacist with a moderately well equipped laboratory could make, as well as a "host that are advertised to the profession exclusively and used with the same blind faith and for precisely the same reason that the people use hop bitters and St. Jacob's oil." It was pointed out that the practice encouraged indiscriminate dosing amongst the people, since each circular contained a list of diseases and their symptoms for which the compound is alleged to be a certain cure, and presented a temptation to an invalid to fit his symptoms and disease to a remedy and buy his bottles without the intervention of the physician, especially if his disease were of a chronic nature and had once been named.

THE RESPONSIBILITY OF PHARMACISTS.

AN important case has recently been tried in the State of New York, which involved a decision as to how far the pharmacist is bound to act under the physician's orders. It appears that in October, 1880, a prescription was presented by a woman to an assistant in a drug store in the Broadway, New York, ordering a considerable quantity of laudanum, and bearing the instruction, "Please give to bearer sixty drops in the store." The assistant sought the advice of his employer, who objected that twenty-five drops of laudanum was a full dose, and refused to administer sixty drops in the store unless the physician were present to take the responsibility. Eventually, upon the woman's plea that she was ill and needed the laudanum, the pharmacist poured out ten drops, which she swallowed in his presence. A year afterwards, two suits for damages were entered against the pharmacist, one by the woman for ten thousand dollars and one by her husband for five thousand dollars, on the ground that had the pharmacist complied strictly with the physician's orders the woman would have been spared a miscarriage and its consequences. For the defence it was urged that whilst a pharmacist is bound to make up a physician's prescription it is no part of his duty to administer the medicine. The judge adopted this reasonable view, and further remarked that if a physician, intentionally or by mistake, wrote a prescription for a dangerous quantity of poison, and a pharmacist administered the poison with a knowledge that it was dangerous, he would be personally responsible for the consequences if the patient died. It was further urged that the quantity of laudanum administered was not only insufficient to do good, but had acted injuriously. But this argument also failed and the jury returned a verdict for the defendant.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

THE annual meeting of this Association will be held on Thursday, July 20, at 8.30 p.m. precisely. The President, Professor ATTFIELD, F.R.S., will occupy the chair.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday the 5th instant, the usual monthly meeting of the Council of this Society was held in the College of Physicians, Kildare Street, Dublin, at three o'clock.

The President, Professor Tichborne, in the chair.

The other members of the Council present were:—Dr. Montgomery, Messrs. Allen, Bennett, Brunker, Grindley, Hayes, Pring, and Simpson.

Mr. Hugh J. Fennell, the Registrar, read the minutes of the last meeting, which were confirmed.

A letter was received from Dr. R. W. Harley, stating his wish to resign the Examinership in Pharmacy.

The President suggested that Dr. Harley, who was at that moment conducting an examination in an adjacent room, should be asked whether he could conveniently assist at the next following examination, so that the election for his successor could afterwards be held cotemporaneously with the other elections.

Dr. Montgomery was deputed to ask that question and, having done so, brought back word that Dr. Harley wished to be relieved at once from the duties of examination, as from the extent of his private practice he felt that he should be unable to devote to them the necessary time and attention.

On the motion of Mr. Brunker, seconded by Mr. Grindley, it was resolved that the resignation of Dr. Harley be accepted with regret, and that the Registrar be directed to advertise for another Examiner to be appointed at the August meeting of the Council.

A letter was received from Mr. Adam Speers, B.Sc., of London University, and Head Master of the Sullivan Schools Laboratory, Holywood, county of Down, dated June 28, requesting that the Chemical Laboratory of that institution should be recognized by the Pharmaceutical Society. The writer stated that the laboratory was licensed for advanced chemical work by the Science and Art Department, and was large enough to accommodate twelve students, analysing at the same time. It was constructed on the South Kensington plan, and contained all the appliances necessary for qualitative and quantitative analyses of both organic and inorganic substances. Amongst the students there were always some who were studying for the examinations of the Pharmaceutical Society. An inspection of the laboratory was invited. He (Mr. Speers) had had seventeen years' experience as a teacher.

The President: Does Mr. Pring know anything about the school?

Mr. Pring: I know Mr. Speers. He is a very superior man; but I never inspected the school.

The President suggested that the matter should be referred to Mr. Pring for investigation. At the same time it might be laid down as an axiom that unless an establishment of the kind was exactly suited to what the Society required it should not be recognized. What they wanted was practical working for a given period, quite independent of any theoretical teaching. The theoretical course was a separate matter.

Mr. Brunker said he did not like the idea of adding any schools to the list of institutions already recognized by the Society. The English Society was making strides in the direction of a fixed curriculum, which was quite inconsistent with maintaining a connection with small schools that they knew nothing about. The Society had already recognized two schools in Belfast, which was quite sufficient for the North.

On the motion of Mr. Brunker, seconded by Dr. Montgomery, it was resolved:—

"That the Council are not disposed to extend their list of schools of practical chemistry at present."

A letter was received from Mr. William Savage, B.A., of Rathfarnham, in reply to a letter which had been addressed to him by the Registrar relative to the Medical Hall, No. 4, Mall, Waterford. The writer stated that he was the only brother of the late Mr. Savage, proprietor of the concern, and was appointed his executor by the Court of Probate on March 22, 1881. The deceased, who left no issue, had named as his successor a son of the writer, Mr. James Savage, who was studying for a qualifying examination and had a pharmaceutical chemist engaged in conducting the establishment. The writer was merely managing the establishment as executor until certain liabilities were paid off, and so far from having even received his administration expenses he was already a loser.

The Registrar was directed to acknowledge the receipt of the letter of Mr. Savage.

A letter was read from Mr. G. A. Webb, of 141, York Street, Belfast, who stated that he had seen a statement which was erroneous in the report of the proceedings of the last meeting of the Council in reference to the case of Mr. Carse.

The consideration of the letter was postponed until next meeting.

The Registrar was directed to send a copy of the letter to Mr. Payne.

A letter was read from the Secretary of the British Pharmaceutical Conference, requesting the Society to appoint delegates to the approaching meeting of the Conference at Southampton.

The Registrar was directed to reply that the President and Mr. Bennett would attend the Conference as delegates.

A communication was made to the Council in reference to Messrs. Boyd and Goodwin, and after some discussion,

On the motion of Mr. Pring, seconded by Mr. Grindley, the Registrar was directed to inform that firm that the Council had proof that they were still engaged in compounding, and to call their attention to the penalties which they incurred by so doing.

On the motion of Mr. Brunker, seconded by Mr. Simpson, the Registrar was requested to communicate with the Registrar of the King and Queen's College of Physicians, thanking him for his letter with reference to the proposed additions to the Schedule of the Poisons Act, and informing him that the Council approves of the recommendations made by the College.

Mr. Brunker submitted a report of the Pharmacy Act Amendment Committee. It gave a *résumé* of the amendments which the Committee had from time to time proposed to be made in the Pharmacy Act (Ireland), 38 and 39 Vict., cap. 57. These were in print and had been circulated. The Committee now recommended for the consideration of the Council the following additional amendments:—1. That no pharmaceutical chemist or apothecary shall legally hold a branch establishment for the retail of poisons or compounding of prescriptions, except under the responsible management of a duly qualified pharmacist. 2. That all assistants engaged in dispensing must give sufficient proof of their competence by examination, or by having passed a sufficient time as apprentices. 3. That all candidates for the licence shall be required to produce evidence of having passed three years in a *bonâ fide* apprenticeship to an apothecary or pharmaceutical chemist keeping open shop.

The President said he did not think the Council ought to go back on apprenticeships, involving fees. These had been discarded in every branch of the medical profession. If the Council wished to increase the time to be spent in the practical learning of pharmacy to three years, that was another question and it should equally apply to apprentices and assistants engaged in compounding.

Mr. Pring said he never took a fee with an apprentice.

Mr. Grindley remarked that there had not been time to consider the new recommendations.

The President suggested that they should be printed and sent round.

On the motion of Mr. Hayes, seconded by Mr. Bennett, it was resolved—

"That the additions proposed by the Pharmacy Act Amendment Committee be printed and circulated amongst the members of the Council at an early date."

The report of the Committee appointed to examine the certificates of candidates for the licence was submitted. It appeared that the certificate for practical pharmacy of one gentleman had been rejected.

Exception was taken to the action of the Committee in that respect, but as it only put back the candidate for three months the report was unanimously adopted.

Some formal business having been transacted, the Council adjourned.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The last ordinary meeting of this Association for the present session was held on Thursday, July 6, 1882. Mr. H. G. Greenish, Vice-President, in the chair.

Mr. A. T. Job read the second part of his paper upon the "Artificial Production of Benzoic Acid and of Oil of Bitter Almonds." This portion of the paper dealt mainly with the practical details of the process. The two papers will be published as a whole in a future number of this Journal.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Alcock, Cripps, Evans, Haward, Parker and Yeatman took part. A vote of thanks was passed to Mr. Job.

Mr. E. Marsh then read some "Notes upon some Reactions of Glycerine," in which the tests that have been proposed from time to time for the recognition of this substance were described. The principal tests, experimentally shown, were: the permanganate of potassium test, which substance glycerine reduces only slowly; Reichl's test, depending upon the formation of glycereïn when glycerine is heated with sulphuric acid and carbolic acid, the glycereïn being recognized by its reaction with ammonia, resulting in the production of a red coloration; Senier and Lowe's test, which depends upon the property which glycerine possesses of liberating boracic acid from borax, which is recognized by the green colour imparted to the flame, and also Donath and Mayrhofer's test, founded upon the same fact as the preceding.

A discussion then took place, in which the Chairman, Secretary, Messrs. Alcock, Braithwaite and Evans took part. A vote of thanks was passed to Mr. Marsh.

After the transaction of a considerable amount of miscellaneous business the meeting adjourned.

ROYAL INSTITUTION OF GREAT BRITAIN.

Some of the Dangerous Properties of Dusts.*

BY F. A. ABEL, C.B., F.R.S.

(*Concluded from page* 17.)

The locality selected for the first experiments formed a portion of some obsolete fortifications at Chatham, and consisted of a masonry gallery or *Caponier*, 8 feet 8 inches high to the spring of the arch, and 8 feet wide below the arch, to a distance of 28 feet from the closed end; from that point it tapered on one side to 6 feet along a length of 2 feet 6 inches, and was 6 feet wide for a length of 3 feet 6 inches, up to a pier or square column 4 feet by 3 feet 6 inches; round which the gallery curved, being at this part 4 feet 2 inches wide. The straight part of the gallery, from the dead wall at one end to the projecting pier at the other, was 34 feet long. In the wall to the left of the blocked end there were six narrow loop-holes up to the curve, commencing at 18 feet from the end, and 2 feet 6 inches apart; in the opposite wall there were four, commencing at the same distance and 5 feet apart; over the wall at the blocked end of the gallery there was an opening into the outer air, and a considerable current of air passed through it along the gallery to the curved end, which led into a large narrow gallery at right angles to this wide one, and having large chambers opening into it.

In some preliminary experiments, an iron tube was let into the face of the wall at the blocked end of the gallery so as to represent a strong blast hole, and this was charged with $1\frac{1}{2}$ lb. of powder, untamped in some experiments and tamped in others. Some pieces of guncotton were suspended from the roof of the gallery at a distance of 28 feet and farther along, and observers were stationed outside the gallery opposite the several loop holes. But, while the pieces of guncotton were not inflamed, there were conflicting opinions concerning the distances at which flame was seen, probably caused by the general illumination of the gallery by the flash of the explosion It was moreover, found that the iron tubes containing the charges were more or less considerably torn, so that portions of the exploding charge escaped laterally. The following method of experimenting was eventually adopted. Charges of $1\frac{1}{2}$ lb. and 2 lb. of powder, untamped and tamped, were fired from a small roughly bored out gun block, the bore of which was 1 foot 9 inches long and $2\frac{3}{8}$ inches in diameter; the gun was raised so as to project the flame right along the gallery at about its centre. A light woodwork frame, 5 feet square. was fitted with thirty-six cross wires 1 foot apart, so as to furnish thirty-six points of intersection; to each of these points a small tuft of guncotton was attached, and the target thus fitted was fixed vertically so as to face the charge, in the centre of which was fixed an electric fuse. In this way small charges of guncotton were distributed uniformly over all parts of the target, which filled a great part of the section of the gallery. The distance of the target from the charge being gradually increased in successive experiments to 20 feet, it was found that with the employment of $1\frac{1}{2}$ lb. and 2 lb. charges, untamped, in three instances out of ten experiments only one, or at most two of the tufts of guncotton were inflamed, this being apparently the extreme distance to which flame, or matter sufficiently hot to inflame guncotton, was projected. At a distance of 19 feet, with $1\frac{1}{2}$ lb. charges, two out three shots did not inflame any of the guncotton tufts. With $1\frac{1}{2}$ lb. charges firmly tamped, one tuft only of the thirty-six was fired, in two experiments, at a distance of 20 feet, while in three others no guncotton was inflamed.

It appears from these results that in a gallery or mine working of an area not very dissimilar to that in which the accidents just referred to occurred, the flame or heated gases from $1\frac{1}{2}$ lb. and 2 lb. charges, fired under conditions favourable to the production of the maximum flame, and its complete projection in the direction of the discharge, only reaches occasionally, and to a very limited extent, to a distance of 20 feet. No doubt a powerful air current in a mine, passing in the direction in which the shot is fired, must have a tendency to aid the spread of the flame to a greater distance, but the difference between 20 feet and 100 feet, the flame having in the latter instance extended to a distance of 75 feet along a gallery at right angles to the point of ignition, is far too great to be only ascribable to the effect of an air current in elongating the flame. As the first of the loopholes above referred to existing in the walls of the gallery was 18 feet from the shot, they could hardly affect the distance to which the flame was found to reach.* It will be observed that these results correspond with those which Mr. Hall obtained with 4 lb. charges of powder in an adit, the dimensions of which are not specified.

No gallery of large dimensions and free from the small lateral openings was available for the continuance of these

* Read at the Weekly Evening Meeting, Friday, April 28, 1882.

* The closing up of these was not found to affect the results.

experiments, but it was thought that some experiments in subterraneous passages of much smaller dimensions (military countermines) might give instructive results. A so-called envelope gallery was therefore first selected for the purpose. This gallery was 5 feet 9 inches high to the crown of the arch, and 4 feet 9 inches to the springing of the arch, and only 2 feet wide. The part selected for the position of the gun and the target was straight, but the portion immediately beyond was curved. In rear of the gun, the gallery was quite open to a considerable distance. One and a half pound charges, untamped, were fired, and a frame target the width of the gallery and 4 feet 6 inches high, constructed so as to give 15 points for the attachment of guncotton tufts, was placed at gradually decreasing distances from the gun, commencing at 20 feet. Even at a distance of only 14 feet from the charge, none of the guncotton tufts were inflamed; but the target was blown forward about 12 feet and partly broken. It was evident that the fact of the gallery being open at the *rear* of the charge greatly reduced the tendency to the projection of flame to a distance in the direction of the explosion. The resistance opposed to the movement of the air by the curvature of this very narrow gallery, a short distance in front of the seat of the experiments, may have also contributed to diminish the distance to which the flame or highly heated gases would extend. When the experiments were continued in another gallery, of the same dimensions, but straight and terminating in a head, like a drift in a mine, the cannon being placed close up to the face of the drift, several of the tufts of guncotton were inflamed at a distance of 27 feet; one was inflamed when the target was 30 feet off, and one also at a distance of 32 feet, but none were ignited at a distance of 35 feet from the charges. Here then, in a long gallery, narrow in proportion to its height, but in all respects representing a drift way in a mine, the distance to which the flame of a blown-out shot of 1½ lb. of powder extended was less than 35 feet, and therefore considerably less than one-half the distance from the seat of the blown-out shot of 1 lb. of powder where the men were burned, in both directions in the cross workings, in the accident above cited. The influence of coal dust in increasing the distance to which the flame from a blown-out shot will extend in mine workings is therefore conclusively demonstrated by a comparison of the effects of those accidents with the foregoing experimental data. On the other hand, the important circumstance noticed by Mr. Hall that no signs of burning on the props in the mine were visible at greater distances than a yard or two beyond the spots where the men were waiting, although there were open workings in both directions for some considerable distance, and although the flame was sufficiently extensive at those spots to injure the men severely, proved conclusively that coal dust had not the power, in these two instances, to carry on the flame to a great distance from the source of fire. Had there been any gas in the air of the mine the flame would doubtless have extended much farther, and perhaps throughout the adjacent workings. The amount of dust raised by the blown-out shots may, however, have been less considerable than in other similar occurrences, and the dust itself may not have been so highly inflammable, or otherwise of so suitable a character for carrying on flame, as that existing in other mines where undoubtedly dust has played an important part in enhancing the magnitude of explosions. At any rate these results demonstrate the necessity for the exercise of caution in drawing conclusions of too sweeping a nature with regard to the causes and the extent of such coal mine explosions as cannot be quite clearly ascribed to fire-damp. A few experiments have been made, in the largest gallery (Caponier) at Chatham, to test the power of coal dust to carry on the flame from a blown-out shot. A large quantity of very fine and inflammable coal dust, from Seaham collieries, was suspended in the air by employment of sufficient mechanical contrivances, and clouds of the same dust were also blown into the gallery in the direction of the shot, and immediately in front of it, just when it was fired. One of the frame screens was placed across the gallery where the pier jutted out (at a distance of 34 feet from the shot), and pieces of guncotton were attached to nails driven in the wall along the short narrow part of the straight gallery and to some distance round the curve. In every one of the experiments tried (three) with 1½ lb. of powder, fired when dust was thickly suspended and carried along in the air, the flame burned a number of pieces of guncotton on the screen; in two experiments guncotton was burned at a further distance of 1 foot 6 inches, but not beyond; in the third, some flame travelled to the end of the straight gallery, and to a distance of 4 feet 8 inches beyond the curve, but guncotton was not inflamed beyond that point. In this case, therefore, flame reached rather more than, and in the others not quite, double the distance with dust thickly suspended in the air, to what it did in the absence of dust. Experiments will be continued in the long narrow galleries which have been spoken of.

It must now be accepted as beyond question that very few, if any explosions have occurred of which the destructive effects, so far as burning and production of the fatal after-damp are concerned, have not been more or less considerably increased through the agency of the coal dust raised by the explosion, and that the latter has been in very many cases instrumental in causing the burning effects of the explosion to spread over great areas, and to reach to workings which, in the absence of dust, would have escaped the visitation. Even of late years, long since the observations of Faraday and Lyell have been confirmed and extended, mining engineers and others immediately connected with the working of coal mines have been very prone to ascribe explosions, which did not admit of satisfactory explanation by an accidental failure of ventilation or other evident causes, to the sudden disengagement or outbursts of fire-damp, such as are, in fiery coal seams, of no uncommon occurrence, and sometimes very serious in their magnitude and long continuance, and to charge such sudden escapes of gas into some part of the mine workings with the whole extent of the disaster, rather than to credit coal dust with any important share in the origination or even in the extension of the explosion. In many instances the occurrence of such outbursts, following upon falls of roofs or the firing of shots, or the rapid disengagement of fire-damp from coal or goaves, consequent upon sudden changes in atmospheric pressure, have been clearly proved to have preceded disastrous explosions; in others, however, the conclusion that an explosion has been connected with the occurrence of a sudden disengagement of gas in considerable volume, has been based upon assumptions or conjectures, more or less admissible, or upon evidence of doubtful nature collected after the explosion (as in the case of the recent explosion at Seaham Collieries). Under any such circumstance, however, it is, to say the least, extremely difficult to realize how sufficient gas to produce an explosive atmosphere can be conveyed, even by the most powerful ventilating currents which can circulate in mines, from the seat of such a sudden outburst to far distant portions of the mine to which the actual explosion is proved to have extended, within the period which is known or believed, to have intervened between the first disengagement of the gas and the firing of the explosive atmosphere produced thereby *in the vicinity* of the outburst, by the firing of a shot, by a defective lamp, or by other means of ignition. On the other hand, the character of the effects which in many instances have been produced by the explosion; the evidences of severe burning such as could not be produced by the rapid explosion of a gas mixture only, and the deposition of partially burned or coked dust in very distant and distinct parts of the mine workings, leave no room for doubt that coal dust has played a more or less important part in almost all the explosions which have been of late submitted to investiga-

tion. Further, it must be conceded that in some instances, coal dust would indeed appear to have been the chief instrument of destruction.

To sum up; it has not been difficult, as will have been seen from the foregoing, to demonstrate experimentally that the existence of a very small proportion of fire-damp in the air of a mine may determine the propagation of flame by coal dust, ignited by the explosion of some local accumulation of a gas mixture, or by the inflammation of gas suddenly disengaged, or even by the flash from a blown-out shot. It has also been clearly established that in so called fiery mines the air is never likely to be actually free from fire-damp, and that as much as 2 per cent. may exist in the return air of a very efficiently ventilated mine of that class. It must therefore be regarded as a thoroughly well grounded conclusion that, in many disastrous explosions, coal dust is the chief agent of destruction, and it is indisputable that but few explosions occur of which the effects have not been more or less considerably extended and aggravated by the coal dust which is raised by the fire-damp explosion. It may also be admitted as not improbable that in some instances, the influence of dust may, apart from its combustibility (as described), determine the ignition of a mixture of air and dust with a small proportion of fire-damp, by the flame which a blown-out shot, or the accidental ignition of some local accumulation of explosive gas mixture has produced. Lastly, it is conceivable, as contended by Friere Marreco, Galloway, and some continental observers, that a mixture of an inflammable coal dust and air, may even, in the complete absence of fire-damp, both originate and carry on to some distance, explosions which, though much inferior in violence to those developed through the agency of gas mixtures, will be at least equal to them in regard to the disastrous effects on the lives of those exposed to them. That mixtures of coal dust and air alone may have the power to carry on the explosion originally caused and disseminated by a gas, air, and dust mixture, into regions where no gas whatever exists, will now be generally admitted. The great disturbance of the air which must proceed in immediate advance of the rush of flame produced by the ignition of a mixture of gas and air charged with coal dust, will, in many mine workings, raise a dense cloud immediately in front of the flame, and the latter will thus be fed as it advances. Mr. Galloway concludes, as the final result of his experiments with coal dust, that the presence of fire-damp is altogether unnecessary to *bring about* a coal mine explosion, but, admitting that the result of certain experiments may seem to favour this conclusion, its realization necessitates the fulfilment of conditions which cannot but be very exceptional, and its acceptance is certainly unnecessary to add to the formidable character of coal dust as a source of danger and an agent of destruction in mines.

Whether an explosion originates with, or is chiefly caused by, the production of a mixture of fire-damp with air in such proportions as to be more or less rapidly and violently explosive; whether the originating cause be the reciprocal influence of a small proportion of fire-damp and of coal dust (or dust of other descriptions of minerals occurring in coal mines) co-existing in the air of a mine; whether, possibly, it simply originates with a mixture of very inflammable coal dust and air in the complete absence of fire-damp, or whether, lastly, only the very limited concession be made that coal dust will add to the extent, and increase the burning effect, of a fire-damp explosion; in any case, the existence of dust in abundance, and in a dry state, in coal mine workings, must be recognixed as a source of danger not greatly inferior to that caused by local accumulations, or the accidental liberation, of fire-damp. The possibility of dealing with this source of danger should therefore be as much an object of earnest work as has been the improvement of ventilatlng arangements for mines.

It being generally impracticable effectually to deal, by actual removal, with the continual accumulation of dust in mine workings, the only available method of diminishing the dangers arising from its constant production appears to be that of maintaining the floor in the roads, etc., in a damp condition by efficient watering arrangemenst, almost continally applied. The high temperature of the mine, in many instances, must often render this a difficult and costly process, on account of the rapidity with which the water will evaporate; hence attempts have been made to apply hygroscopic substances (such as calcium chloride, sea-salt, or rock-salt) in conjunction with water, or to use brine, with a view to retard its evaporation, and some successful results appear to have recently attended their application in several districts. In some instances with improved appliances for the uniform and periodical distribution of sufficient water, the maintenance of mine roads in a sufficiently damp condition to prevent dust from being raised in any considerable quantity appears to have been accomplished with fair success; there are, however, localities where it is almost impracticable to maintain the floor of the roads in a damp condition, in consequence of the great increase thereby of the tendency to their being gradually raised by the pressure to which they are subject.

Apart from the effects of dust in augmenting the disastrous results of such fire-damp explosions as may arise from the existence of a defective, or an open safety lamp in the vicinity of an accumulation of gas, or of a locality where a sudden outburst of gas occurs, the *blasting* of coal or of rock, in those parts of a mine where fire-damp may exist, if even only in very small quantities, constitutes the chief source of accidents in which coal dust may have played an important share. There is no doubt, therefore, that the elaboration of really safe methods of getting coal in places where blasting by powder is now resorted to, and of removing the harder rock in the working of drifts where fire-damp may exist, will most importantly contribute towards the diminution of danger arising from the accumulation of dust in mines. The substitution of efficient coal cutting machines for blasting may to some extent supplant the use of powder, and the employment of compressed air as an agent for bringing down coal or rock has been made the subject of ingenious contrivances, which appear, however, as yet, to labour under some disadvantages in regard to cost, facility of use and general efficiency. Attempts have been made to render the employment of powder in the presence of fire-damp safe, by using it in conjunction with water. In the first instance it was proposed by Dr. Macnab to bring the latter into direct operation as the cleaving or blasting agent by inserting a cylinder containing water into the blast hole, and connecting it with a very strong external vessel, in which the powder charge was fired, much as the powder charge is fired in the powder chamber of a gun, the generating gas being brought to bear upon the confined column of water, and causing the latter to exert a rending force upon the coal by which it was surrounded. As the results furnished by this method of operation were not promising, the comparatively very simple expedient was resorted to by Dr. Macnab of employing water simply as tamping in a charge hole, a cylinder containing the liquid and of suitable length to fill the hole being inserted over the charge of powder. In the event of a charge blowing out, the dispersion of the water in a very finely divided condition was relied upon to effect the extinction of the volume of flame which, under these conditions, would be projected into the air of the mine. Some carefully conducted experiments, with blast holes charged by this method and surrounded by an explosive gas mixture, showed that occasionally no ignition of the gas resulted from the blowing out of the shot, but that in most instances, the conditions of the experiments being the same, the gas mixture in front of the blast hole was exploded, when the shot blew out. It is possible that a careful regulation of the charge and length of tamping may render this mode of operation a comparatively safe one, though it may be doubtful whether absolute reliance could be placed upon the invariable extinction of flame

in the case of blown-out charges. When the attention of the Royal Commission was directed to the subject of the dangers attending the employment of explosives in coal mines, it occurred to Mr. Abel to attempt the application to the getting of coal of the principle which he developed some years ago, in the course of his researches on explosive agents, namely, the sudden transmission in all directions of the force exerted instantaneously by a *detonation*, by surrounding the detonating charge with water. It was found in a large number of experiments that when comparatively small charges of guncotton or dynamite (the latter being preferable) were enclosed in cylinders of light metal or paper filled with water, and occupying the entire available space (or nearly so) in a blast hole, the detonation of the charge in holes of excessive strength, when employed in proper proportion to the amount of water by which it was surrounded, was always accomplished without ignition of the explosive gas mixture with which the opening of the blast hole was surrounded. The interesting fact was moreover established, by operations carried out in hard coal in Lancashire, that the action of the detonating charge is modified to great advantage, by enclosing the envelope in a long column of water. Instead of exerting a powerfully crushing or disintegrating action, confined within comparatively narrow limits, whereby a charge of guncotton or dynamite is rendered of little value as a means of getting coal when used in the ordinary way, the distribution of the explosive force in all directions by the column of water causes it to exert a cleaving or splitting action even superior to that exercised by ordinary blasting powder. The farther development of this method of applying detonating agents to blasting purposes in coal-mine workings appears therefore well worthy of attention.

Another method of getting coal, which, though not new in itself, has been applied in a novel manner and with most promising results by Messrs. Smith and Moore, has the great advantage of dispensing entirely with the use of explosive agents, and of any but the most simple mechanical appliances.

It consists in applying the force which quicklime will develope if confined, and made to combine under that condition with water, whereby it undergoes very considerable expansion, a large amount of heat being at the same time developed. Messrs. Smith and Moore convert the freshly burned and crushed quicklime into very compact cylindrical masses, or cartridges, having a small groove on one side so that when the requisite number of cylinders are inserted symmetrically into the mechanically drilled hole in the coal, which they fit accurately, a narrow pipe, with perforations along its entire length, enclosed in a tight-fitting stocking of open webbing and provided with a stopcock, may be inserted into the side of the charge, which is afterwards tamped in the usual manner. The proportion of water necessary to slake the lime, *plus* an excess of about one-sixth, is then forced into the hole through the pipe by means of a simple hand syringe, and the stopcock of the pipe being closed the operation is complete. In a brief space of time sounds indicative of the cracking of the mass of coal which contains the cartridge show that the expansion of the lime by its union with the water, and the very considerable development of steam within the cartridges, are performing their work, and after an interval of time varying with the strength of the part of the seam operated upon, the coal is detached in large blocks. The holes can be charged so rapidly that a considerable number may be put into operation in quick succession by one or two men.* As the action of the charge occupies some little time (fifteen or twenty minutes), they really come into operation together, and in this way large faces of hard coal in longwall workings are brought down with ease and certainty. Whether these compressed lime cartridges can be applied with any success in stone still remains to be determined, but in point of cost, simplicity, and above all, safety, this method of detaching coal appears to rank before any other yet tried. Besides entirely avoiding the use and production of flame or fire in the blasting of the coal, the operation is conducted gradually and almost noiselessly, and the raising of dust by the more or less violent concussions which attend the employment of explosives in any form or manner is avoided.

It is insisted upon by a great majority of those most competent to judge that the employment of explosives cannot be dispensed with in the profitable working of coal mines. That the use of gunpowder in the ordinary way, even with strict attention to all practical precautions, is a most prolific source of accident has long been recognized. The development of safe methods of applying explosive agents or of simple and effective substitutes for them is therefore of such paramount importance in securing protection to the miner against the dangers of fire-damp and of coal dust, that those who are entrusted with the management of coal mines should spare no exertions to test rigorously but fairly the merits of any proposals which afford promise of success in this direction.

* In one of several operations of this kind recently witnessed by the lecturer at Shipley Collieries, Derby, in the "deep hard seam," which is nearly 3 feet thick, ten shots were fired together, bringing down a block of coal 39 feet long by 3 feet thick and 2 feet 10 inches high, weighing about ten tons. The average time occupied in boring a hole (by mechanical drill), charging and tamping it, and watering the charge was twenty minutes. The usual operation of bringing down this very hard coal by wedging is exceedingly slow and laborious.

PHILADELPHIA COLLEGE OF PHARMACY.

(*Concluded from* p. 40.)

The following paper was then read on—

Chlorinated Oil.

BY DR. L. WOLFF.

The use of chlorine gas, in the form of chlorine water, in chronic affections of the skin, is by no means of recent origin, and already Thenard and Cluzel recommended the frequent immersion in chlorine wster of the hands of those afflicted with itch, by which they claimed to have obtained most excellent and rapid results.

About fifteen years ago I had cause to try it, and had a most excellent success with it; though to make its effect more lasting and emollient, I experimented with a liniment composed of equal parts of olive oil and chlorine water. The efficacy of this was not less potent, but the absence of any of the characteristic odour of the gas in this liniment struck me as very peculiar, and I attributed it to a chemical change taking place. As a part of this latter would naturally have to result in the formation of hydrochloric acid, the question arises, if it is the latter or the chlorine gas which had combined with the oil that gave the beneficial results. As the free chlorine in the water, however, had proved effective, the inference is that the chlorine in combination with the oil had given the curative effect.

To test this matter, I was urged by my friend, Dr. J. V. Shoemaker, to make a chlorine compound with oil free from hydrochloric acid, which in the course of therapeutic experiments proved equally effective.

To prepare it I induced a stream of dry chlorine gas, generated in the usual way, into a quantity of oil equal to that of the water in making the chlorine water of the Pharmacopœia, but, to my surprise, found that I was unable to supersaturate the oil, as I had done with the water, no free chlorine becoming at any time evident, until after many days of experiment I ultimately succeeded in my purpose.

The oil so treated showed at first but little change, save that of turbidity, which could not have been due to water being present, as the gas had been well dried. It soon warmed and heated, and vapours of hydrochloric acid were then evolved. It had changed its colour but little, grew viscid and of the specific gravity of 1·059. It was insoluble in alcohol, disproving the presence of free

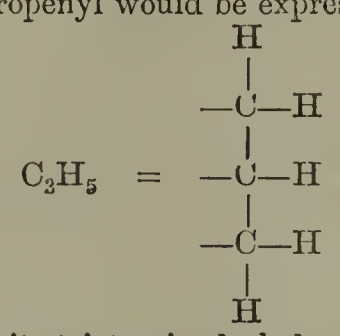
oleic acid; when washed with an equal bulk of water, to free from adherent hydrochloric acid, it showed an emulsifiant tendency. Dissolved therefrom with benzin, and the latter evaporated after previously filtering the solution, it left a product such as I here exhibit. Neutral to test paper at first, it grew acid at standing for some time, with well marked turbidity, thus proving the loosely molecular combination of the chlorine, which, being again substituted by hydroxyl, forms more hydrochloric acid. It possessed no marked odour, and certainly not that of chlorine, and varied in taste but little from that of ordinary oils, no irritant action being manifest when applied to the tissues.

An inquiry on this subject at our former meetings led me to investigate this matter more thoroughly, and I arrived at results which, from a chemical point of view, turned out very interesting.

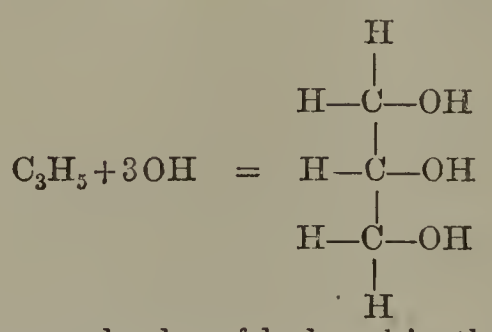
In order to understand the chemistry of this process it is necessary, however, to enter somewhat into the molecular position of the vegetable and animal oils and fats to show exactly where and how a chlorine substitution can take place.

Vegetable and animal oils consist in the main of two principles: one of them, forming on saponification, either with or without great heat or alkalies, is an alcohol named glycerin; the other, forming acids, are termed relatively stearic, palmitic and oleic acids, etc. The radicals of these two constituents are for the former termed propenyl or glyceryl, while for the latter they are known as stearyl, palmityl, and for what that which forms the greatest part of the liquid and semi-liquid fats, oleyl.

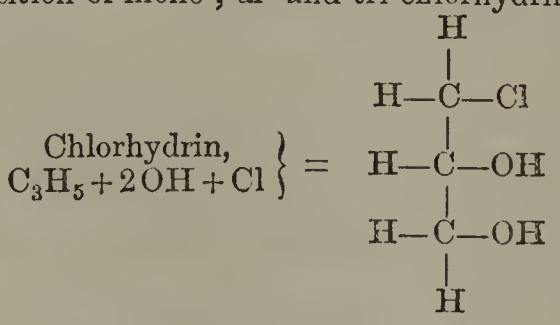
While the propenyl would be expressed as follows:—

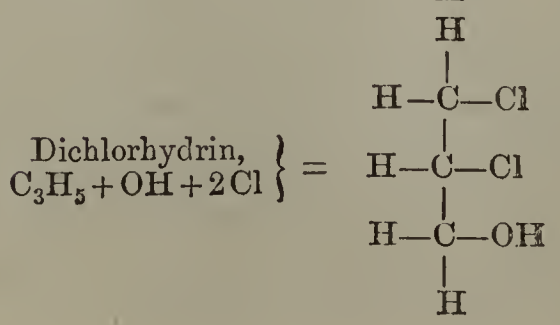


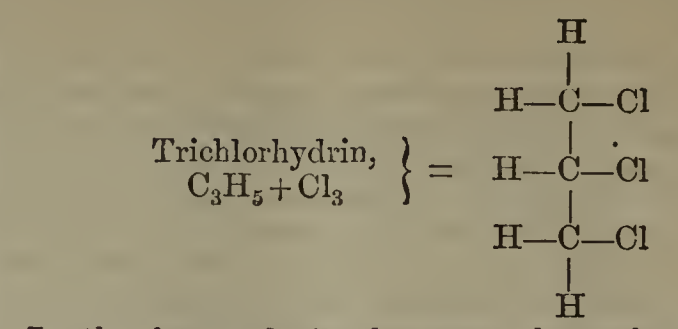
the glycerin or its triatomic alcohol would be constituted thus:—



The three molecules of hydroxyl in the glycerin are easily substituted by several elements or compounds, such as acetic, benzoic, hydrochloric, hydrobromic and other acids; to illustrate this I give below the molecular position of mono-, di- and tri-chlorhydrins:—





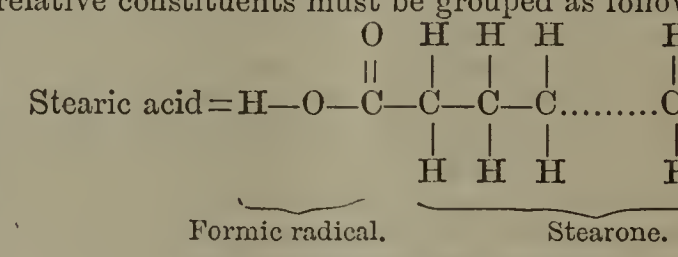


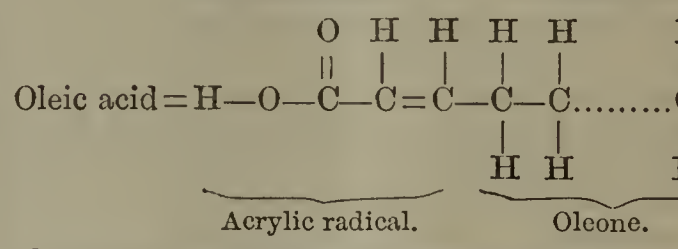
In the fats and oils, however, the molecules of hydroxyl of the glycerin are substituted by the radicals of the fatty acids, such as stearyl, palmityl and oleyl, producing ethers, as which fats and oils must be viewed, as for instance:—

Stearins or propenyl tristearyls $= C_3H_5.3(C_{18}H_{35}O_3)$

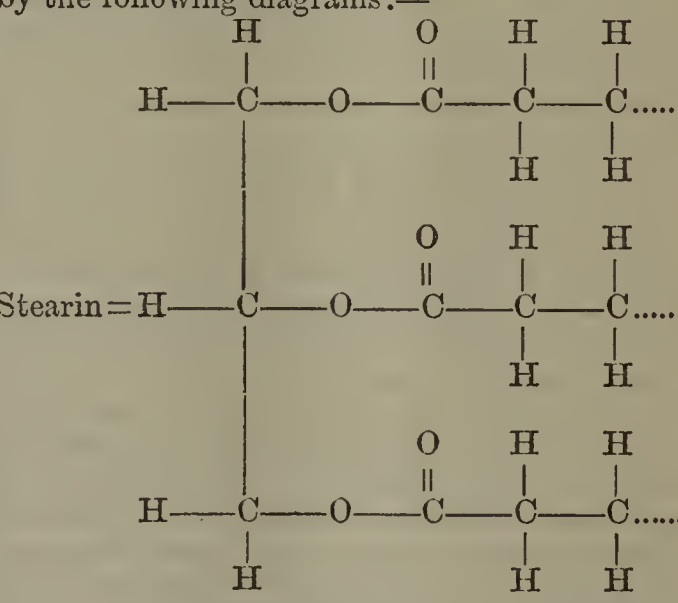
Oleins or propenyl trioleyls $= C_3H_5.3(C_{18}H_{33}O_2)$.

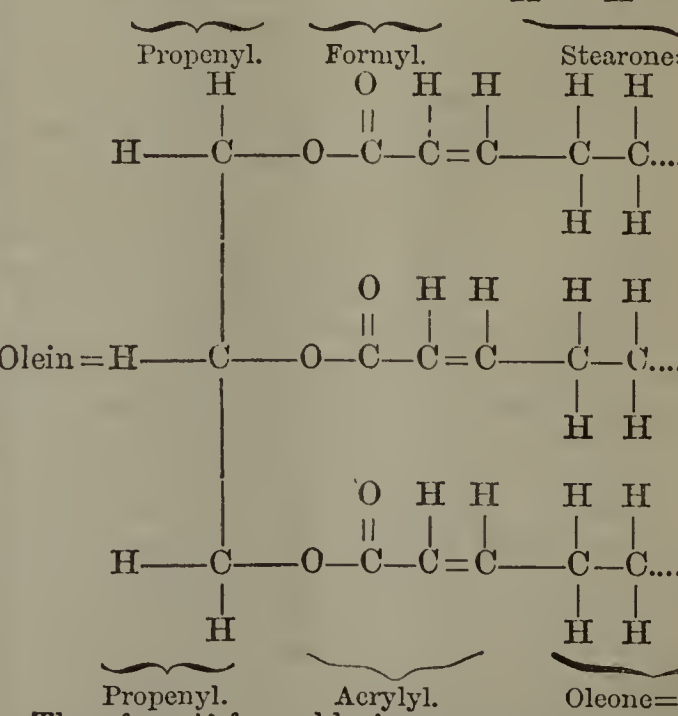
Again, as stearic, palmitic, and oleic acids are acids derived from stearyl, palmityl and oleyl, and have an analogous constitution, the former belonging to the series of formic and the latter to that of acrylic acids, their relative constituents must be grouped as follows:—





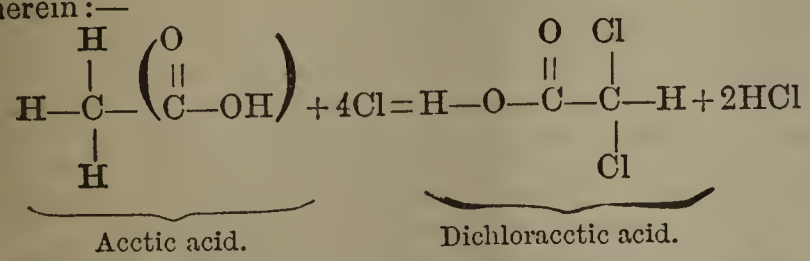
Thus the constitution of fats and oils will be represented by the following diagrams:—



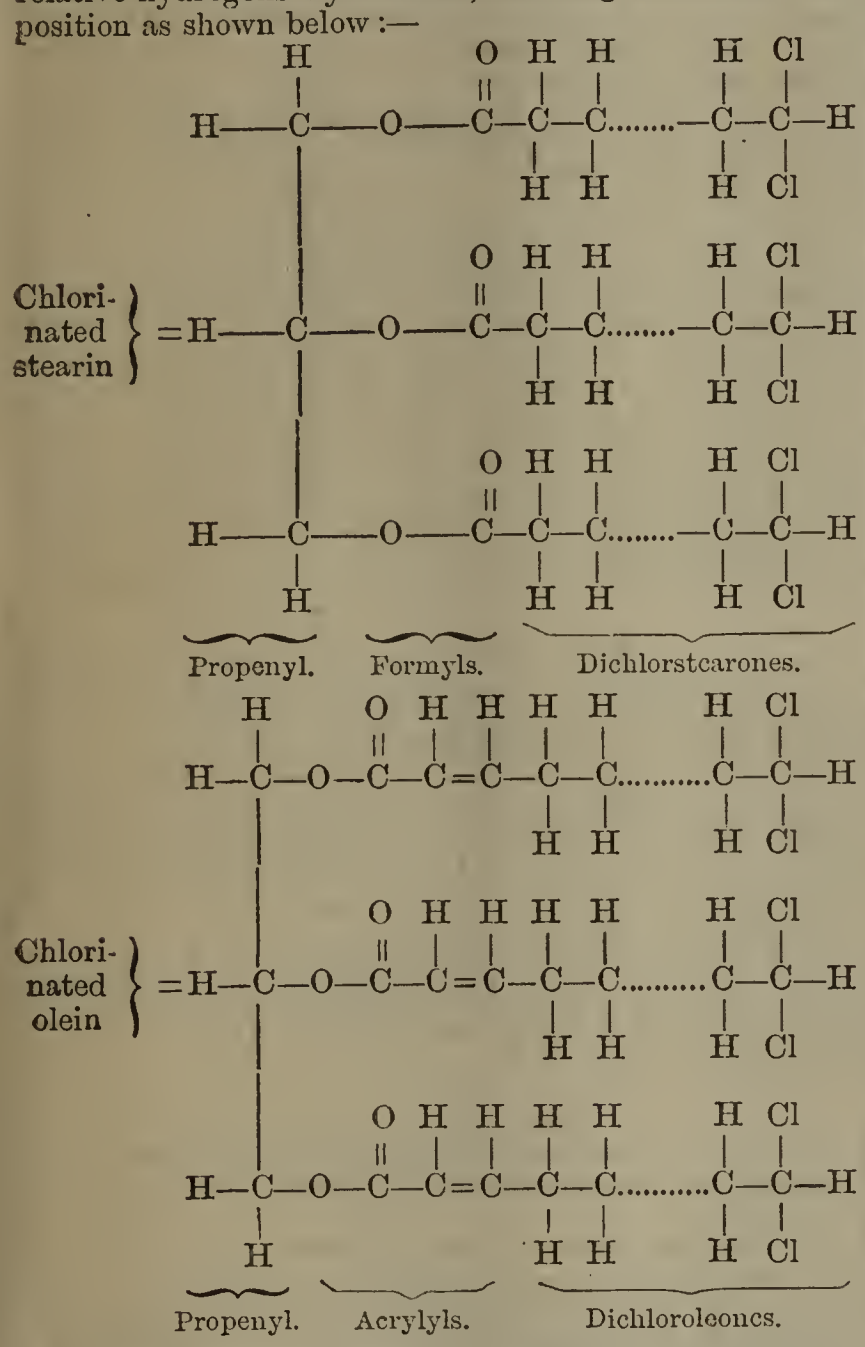


Therefore, if free chlorine gas comes in contact with these molecules, it cannot attack the propenyl, as this is

really substituted by the stearyl and oleyl. Again, the stearyl and oleyl cannot be acted on by the chlorine in their acid nuclei, according to the analogy established by the formation of dichloracetic acid, as will be seen herein:—

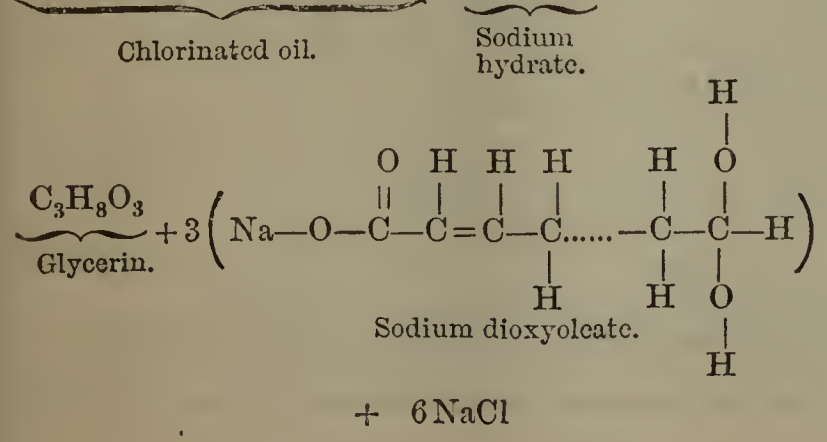


The chlorine must act, therefore, on the hydrocarbon appendices, $C_{17}H_{35}$ and $C_{15}H_{31}$, substituting therein the relative hydrogens by chlorine, resulting in a molecular position as shown below:—



As palmitin and stearin are much alike in their constitution, a reproduction of the structural formula of the former is necessary.

As this chlorinated oil is saponifiable with boiling solutions of the hydrates of alkalies, yielding soap, glycerin and chlorides, I would give below a diagram illustrating its saponification with sodium hydrate:—



The soap so produced manifests no material difference from ordinary soaps, only that in the course of its preparation it separates as it is formed, owing to the great amount of sodium chloride formed in the process.

The chlorinated oil, by computation of its atomic weight, shows 100 parts by weight to contain about 17·9 parts by weight of chlorine, or, in other words, it would take 48 parts by weight of chlorine gas to convert 100 parts of oil into the chlorinated product of which 24 parts by weight enter into the 100 parts of oil, and 24 parts form hydrochloric acid.

It would appear, hence, that in chlorinated oil we have not alone a very interesting chemical body, but one that is very rich in chlorine as well; and as the latter exists therein in a loosely molecular condition, it will readily substitute itself again for hydroxyl, forming chlorine compounds with bodies of stronger affinity, and as such will prove probably of great therapeutic value wherever the use of chlorine, both as disinfectant and parasiticide, is indicated, and possibly presenting a proper antagonistic for bacteriæ, which are daily more shown to form the causation of many diseases.

During the discussion on this paper it was stated that commercial olive oil was frequently adulterated with cotton seed oil, and it was said that the latter was also mixed with lard oil, and that a reliable test for its presence was very desirable.

Dr. A. W. Miller spoke of a new and clumsy adulteration of *sassafras oil* with kerosene, detected by its odour and its insolubility in alcohol; a sample of the adulterated oil was exhibited.

Also a new *vermilion substitute*, free from mercury and of handsome appearance; it is said to be made from a fine specimen of "orange mineral" tinted with eosine.

Parliamentary and Law Proceedings.

Poisoning by Sulphuric Acid.

On Saturday, July 8, Mr. Poole (coroner for North Warwickshire) held an inquest at Aston, on the body of David Nixon, 43, grocer and postmaster, who died on the 5th inst.

The evidence of Dr. Hoare was to the effect that on May 8 deceased took a quantity of sulphuric acid. Witness was called in, and on ascertaining what had occurred he asked deceased what he had done it for. Nixon replied, "I wish I had done it completely." Deceased did not at any time express regret at having taken poison.

A juror said the deceased frequently came to his house, and had on several occasions threatened to commit suicide.

The jury returned a verdict of "Suicide whilst temporarily insane."—*Birmingham Daily Post.*

Poisoning by Ammonia.

On Saturday, July 8, a boy named George Ashworth, aged 11 years, was poisoned by mistake at Halifax. He took hold of a bottle which he thought contained ginger beer, but which contained ammonia, and had a good drink. Milk was given to him afterwards, and medical assistance sent for. By the use of emetics all danger was soon overcome, and the boy recovered.—*Yorkshire Post.*

Alleged Poisoning by Camphor.

A singular case of poisoning was investigated on Tuesday at an inquest held at Oldham. Mary Ogden had been in delicate health for some time, and her husband obtained a prescription from a Spaniard named Maurize Picano. This prescription consisted of laudanum, peppermint, and essence of camphor. Deceased

partook of some, and shortly afterwards she began to be sleepy, and died.

The medical opinion was that deceased had died from an overdose of camphor.

The jury censured the seller, Mrs. Wild, who gave the mixture for the prescription, for not intimating how the medicine was to be taken.—*Morning News.*

Obituary.

Notice has been received of the death of the following:—

On the 25th of April, Mr. Frederick Farrer, Chemist and Druggist, Kessingland, late of Wrentham, Suffolk. Aged 71 years.

On the 27th of May, Mr. Thomas Day Easton, Chemist and Druggist, Danby End, Yorkshire. Aged 50 years.

On the 9th of June, Mr. Charles Christopher Spink, Chemist and Druggist, Market Place, Pontefract. Aged 44 years.

On the 12th of June, Mr. Edward Parker, Pharmaceutical Chemist, Carlisle. Aged 64 years. Mr. Parker had been a Member of the Pharmaceutical Society since 1842.

On the 18th of June, Mrs. Ruth Mabbott, Chemist and Druggist, Manchester. Aged 58 years.

On the 23rd of June, Mr. Richard Eustace Williams, Chemist and Druggist, Mumbles, Swansea. Aged 69 years.

On the 29th of June, Mr. George Alfred Webster, Chemist and Druggist, Green Road, Leeds. Aged 39 years.

On the 29th of June, Mr. Thomas Williams, Chemist and Druggist, Welshpool. Aged 28 years.

On the 8th of July, Mr. Thomas Hill, Chemist and Druggist, Bath. Aged 67 years.

On the 10th of July, Mr. Alfred Fox, Chemist and Druggist, Porter Street, Hull. Aged 27 years. Mr. Fox had been an Associate in Business of the Pharmaceutical Society since 1875.

BOOKS, PAMPHLETS, ETC., RECEIVED.

A Dictionary of Popular Names of the Plants which furnish the Natural and Acquired Wants of Man, in all Matters of Domestic and General Economy. By John Smith, A.L.S., etc. London: Macmillan and Co. 1882.

Manual for the Physiological Laboratory. By Vincent Harris, M.D., etc., and D'Arcy Power, M.A. Second Edition. London: Baillière, Tindall and Cox. 1882.

The Manual of Colours and Dye Wares. By J. W. Slater. Second Edition. London: Crosby, Lockwood and Co. 1882.

Correspondence.

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

The Future of Pharmacy.

Sir,—Our Stockport brethren evidently believe that if they have not virtue they ought to assume it. Their petition reads very well and displays a very laudable anxiety for the future state of pharmacy. I have no doubt these worthy representatives of a worthy craft will point with pride to the memorial, and lay this flattering unction to their souls that at all events their town is free from the reproach of having done nothing to improve the trade. After this commendable display of virtue, you, sir, will no doubt be surprised to hear that by far the larger number of chemists in Stockport "do a large trade" in supplying not only grocers, etc., but little hucksters' shops with (not patents that require no skill in manipulation, but) "drugs, pharmaceutical preparations, etc.;" and these men are not, as you would suppose, small chemists with large families who do not live but simply exist, they are the men of "light and leading" (save the mark), the principal chemists in the town, one, at least, of whom employs a traveller to cultivate this particular trade. One of these worthy gentlemen, when remonstrated with upon the seeming inconsistency between his words and his deeds, indignantly replied, "I am not going to give up so good a portion of my living for all the societies that ever were." Surely the height, or rather the depth, of absurdity has been reached in this. They supply a class of tradesmen with goods, take the cash for them, and then beseech the powers that be to stop these customers of theirs selling the very things they have importuned them to take; these, too, are the men who are loudest in their complaints of the Society doing nothing to help them, whilst they themselves will not so much as lift one little finger to help themselves. The immortal bard says, "To thine own self be true, and it follows," etc. Then let each individual member of our craft be true to the better interests of his chosen trade; let each man of us resolve to leave the trade better than he found it. Then, I venture to predict, we shall have very little of the jealousy and want of confidence of the medical profession, and the question of 9*d.* or 1*s.* 1½*d*, for "Cockle's" will become a very secondary matter, whilst at the same time the Council will be compelled to keep abreast of the opinion of the trade. But so long as every individual has no aim and no ambition higher than his own selfish ends, so long must our and every other community formed of such selfish men continue to grovel in the dust.

131, *Embden Street, Manchester.* J. Hart.

Fresh Bael Fruit (Ægle Marmelos).

Sir,—I notice that some fresh bael fruit has recently been sent to the Museum by Mr. P. W. Squire, and I am glad to find that it is coming somewhat into use.

Three years ago I presented a specimen to the Society, and drew attention to it at an Evening Meeting (April 2, 1879). This was brought to me from Calcutta, by Dr. James M. Laing, of the Indian Service, who told me that the fruit itself was most frequently ordered to be gathered and eaten as occasion required.

The best preparation of it, however, that I have been able to discover, is that made according to the directions given in the Indian Pharmacopœia for 1868, p. 47, and known as extractum belæ.

35, *Baker Street, W.* A. W. Postans.

Senex.—No doubt an iodide of bismuth is formed, which is insoluble. See a paper by Mr. Thresh, *Pharm. Journ.*, [3], x., 641.

C. S.—There is no "Tinct. Valerian. Co., B.P.," and the difference in the appearance of the mixtures was probably due to the preparation used to represent this ingredient of the prescription.

J. Currie and T. Cragg.—Your communications have been handed to the Secretary, to whom all instructions from members, etc., as to the posting of the Journal should be sent.

P. Boa.—Hypericum pulchrum.

"*Infantilis.*"—If you will first turn your attention to the rule respecting anonymous communications, we shall be happy to assist you in your study of the point in question.

H. C. H.—(1) *Vicia hirsuta.* (2) *Trifolium medium.* (3) *Raphanus Raphanistrum.* (4) *Orobanche minor.* (5) Probably *Angelica sylvestris*: send specimen in fruit. (6) *Helminthia echioides.*

C. P.—(1) *Dactylis glomerata.* (2) *Polyporus versicolor.* (3) *Hypnum rutabulum.* (4) *Funaria hygrometrica.* (5) *Evernia Prunastri.*

H. J. Jackson.—Euphorbia Lathyris.

"*Worcester.*"—(1) *Carex riparia.* (2) *Aquilegia vulgaris.* (3) *Vicia Sepium.* (4) *Cytisus Laburnum.*

Communications, Letters, etc., have been received from Messrs. Reynolds, Saul, Delacre, Gregory, Conellan, Boa, West End Pharmacist, John, Naphtha, Inquirer, Theta, C.S.

TO CHEMISTS AND DRUGGISTS, AND OTHERS.

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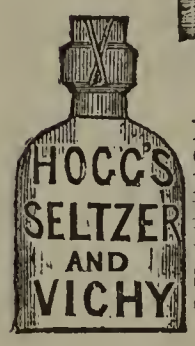

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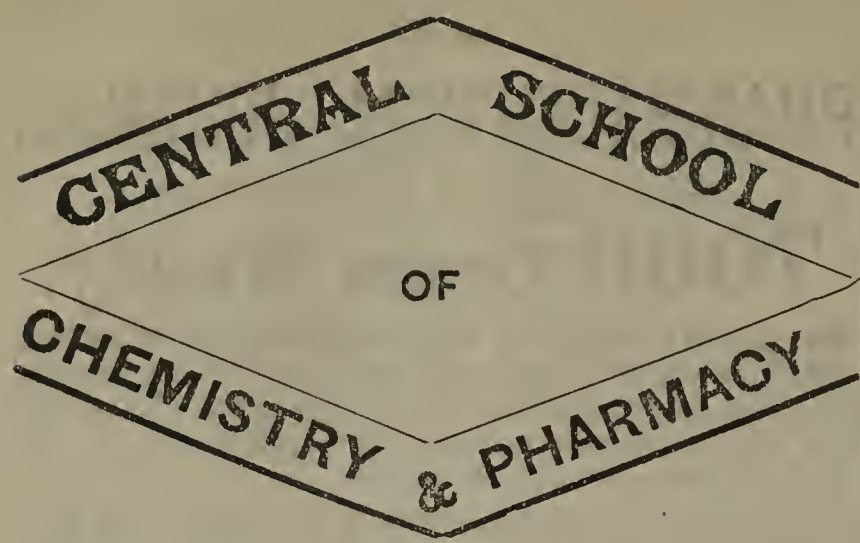
130, CAMDEN ROAD, N.W. (note change of residence)

TWO out of **FOUR** of my Students passed at the JUNE MINOR. Special teaching (private or postal) for JULY candidates. At home for interview daily from 1 to 2.30.

Laboratory close to Gower Street Station.

THE



Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The last course of the present session has now commenced, which will terminate at the July examinations.

The fifth session of this School will open on September 1st, entries for which should be made to

Messrs. **LUFF & WOODLAND.**

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

THE

EASTERN COUNTIES SCHOOL OF PHARMACY.

Mr. W. S. TURNER begs to give notice that he proposes to remove to

MANCHESTER

As soon as possible after this month's exam. He hopes that by careful work he may there obtain such good results from both DAY and EVENING classes as may show the value of his thorough system of instruction, backed as it now is by five years' experience.

GRIMSBY, *July* 12, 1882.

THE WESTMINSTER COLLEGE

The next Session will commence on

FRIDAY, SEPTEMBER 1st.

Pharmaceutical Department.

FEES.

PRELIMINARY	One Month	£2 2s.
	Until Qualified ...	£5 5s.
MAJOR or MINOR (*From September 1st*).	October Exam. ...	£4 4s.
	December „ ...	£8 8s.
	Until Qualified ...	£10 10s.
MAJOR AND MINOR	Until Qualified ...	£15 15s.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

In order to secure the comfort of Students during their stay in College, Mr. Wills (Principal) has made arrangements to provide a number of Students with Board and Lodging at his Private Residence, Gladstone House, St. George's Road, Southwark.

Terms, One Guinea per week (*No Extras*).

The soundness and thoroughness of the education is demonstrated by the fact that nearly half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College.

LONDON MINOR EXAMINATION.

JUNE, 1882.

41 Candidates were examined. **24** Failed. **17** Passed.

FROM THE WESTMINSTER COLLEGE. 14 presented themselves, the following 9 passed		FROM ALL OTHER SOURCES COMBINED. 27 presented themselves, the following 8 passed.	
ARKLE, C. A.	Lancaster	BIRD, F. C. I.	Bath
COOMBS, W. T.	Brentford	DANGERFIELD, W.H.	Devizes
ELTON, T. F.	Cirencester	DARCH, A.	Islington.
HILL, A.	Leicester	HALL, J. T.	Manchester
COATES, U. A.	Walsall	LOWTHER, T.W.	Cardigan
HUMPHRIES, J.	Cleckheaton	MILLS, A. E.	Herne Hill
RICKETTS, J.	Plymouth	WILKINS, E.	Reading
SPENCER, G.	Hitchin	WILLCOCKS, A.S.	Portsea
THOMPSON, C.L.	London		

EVENING CLASSES

WILL RE-COMMENCE ON SEPT. 5TH.

FEES:

MAJOR, 1 month, 8s.; 3 months, £1 1s.
MINOR, 1 month, 6s.; 3 months, 15s.; 6 months, £1 1s.
PRELIMINARY, 1 month, 4s.; 3 months, 10s. 6d.
For prospectus and further particulars, apply to

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AS JUNIOR or IMPROVER, in a good-class Dispensing business. Age 19½. H. EBBAGE, Halesworth, Suffolk.

IN town. From 9 till 5. By a Registered Chemist. Aged 36. Engaged in the evenings. West-end experience. ALPHA, care of Chemist, 68, Devonshire Rd., Grove Rd., N.

AS Junior ASSISTANT, in a good-class Retail and Dispensing establishment. With time for study. 4 years' experience. Passed Preliminary. Age 19. Height 5ft. 7in. R. R. GANT, York Villas, Essex St., Norwich.

AS ASSISTANT. Age 23. Nearly 6 years' experience. Town or country. Disengaged on July 26. DELTA, 44, Calverley Rd., Tunbridge Wells.

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BY a gentleman, qualified, age 25, tall, fair appearance, as ASSISTANT, in London. Unexceptional references and testimonials. Salary about £80, having other means. MINOR, 115, Queen's Rd., Peckham.

AS out-door ASSISTANT or MANAGER of Branch. Registered. Age 30. Married. Thorough practical experience in first-class business. Permanency desired. M. B., 204, Mare St., Hackney.

AS JUNIOR. In London. 4½ years' experience. Age 21. Height 5ft. 11in. BISMUTH, 21A, Devonshire St., Portland Pl., W.

R. E. BUNN'S (LOCUM TENENS or TEMPORARY, of 12, Unity Pl., Woolwich,) present address is, Mr. Sambrook's, Chemist, Agincourt Sq., Monmouth. Excellent references. Terms moderate. Town or country.

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AS JUNIOR. In Mixed business. 5½ years' experience. Age 19½. Height 5ft. 8in. Salary £25. Potteries preferred. BONUS, 1, Spring Gardens, Bradshaw St., Derby.

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AS ASSISTANT or MANAGER. Thorough experience. Now disengaged. 3 years' reference from last place. Out-door preferred. Am registered. W. H., 227, Mayall Rd., Herne Hill.

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LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. Over 30 years' town and country experience, and unexceptionable references extending over the last 12 years. Disengaged 20th inst.

ENGAGEMENTS WANTED.

AS ASSISTANT, in London, with time to attend evening classes or lectures. Age 24. ATKINSON, 31, Thomas St., near Waterloo Rd., S.E.

AS JUNIOR. London preferred. 5½ years' experience. Good reference. T. W. H., 142, Camden St., Camden Town.

W. C. TAYLOR (A.P.S.), TEMPORARY MANAGER, begs to thank gentlemen who have so kindly recommended him, and to state he is now at liberty. 12, Loftus Rd. (late Ellerslie Rd.), Shepherd's Bush, W.

AS MANAGER, by a Registered Chemist. Age 45. Experienced in good-class Retail, Dispensing and Prescribing. No objection to Temporary. B. H., 3, Montpelier Ter., Brompton, S.W.

TEMPORARY. Ætat. 30. Town or country. Thoroughly experienced in all branches of the trade. Irreproachable references. Terms very moderate. Disengaged. A. WOOD, 2, Woodfield Cres., W.

EVENING employment after 6 p.m. wanted. Minor. Age 26 years. G. G., 317, Fulham Rd., S.W.

AS Junior ASSISTANT. In London or suburbs. 5 years' experience. Moderate salary. Good testimonials. A. B., 29, Great Coram St., W.C.

AS TRAVELLER.—A gentleman will be at liberty shortly to represent a good Drug House amongst Surgeons. London preferred. Experienced. S., 43, The Crescent, Salford, Manchester.

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AS ASSISTANT, in London. Good experience. G. B., 24, Cromwell Pl., South Kensington, S.W.

AS ASSISTANT to a Chemist. Would go abroad. Age 28. Good Prescriber and Dispenser. Can Extract Teeth. Good references. G. J. SHARPLES, 7, Chapel Walk, Cross St., Manchester.

AS ASSISTANT. Town and country experience. Good references. Age 24. Apply, with usual particulars, to A. B., Mr. O. Postil, Foxholes, Ganton, York.

AS ASSISTANT, in London or country. Highest references. Over 10 years' experience. Height 5ft. 10in. Age 27. Minor and Apothecaries' Hall qualifications. G., 63, Tollington Rd., Holloway, London, N.

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A REGISTERED Pharmaceutical Chemist wanted, willing to receive a young lady as an APPRENTICE, and to give her the instruction and practice in Dispensing necessary to enable her to pass the examinations of the Pharmaceutical Society. Address, stating terms, SECRETARY of the Society for Promoting the Employment of Women, 22, Berners St., W.

LOCUM TENENS.—By a reliable business man, Pharm. Chemist, of good address and long experience, to take charge during absence, &c. Disengaged. CHEMIST, 2, Chichester St., Westbourne Park, W.

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FOR about 5 weeks from August 3rd.—A competent ASSISTANT, of good address, accustomed to first-class business. Age 24 to 26. Good references indispensable. Apply, personally or by letter, with full particulars, to J. SELLEY, 142, Earl's Court Rd., South Kensington, S.W.

APPRENTICE.—E. C. LEWIN, Market Pl., Boston, has a vacancy for a well educated gentlemanly youth, who has passed, or prepared to do so, the Preliminary examination. Terms and particulars on application.

APPRENTICE.—Immediately. In a first-class Retail and Dispensing business, in the West-end, a well educated youth as an APPRENTICE. 5 others employed. A good premium required. A. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

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IMMEDIATELY—An IMPROVER or Junior ASSISTANT. About 19 or 20. Apply, stating age, salary, &c., M. P. S., care of Evans, Gadd & Co., Exeter.

A JUNIOR. Out-door. In a Mixed business. To Manage a Branch. Must have good references. Apply, STURTON & SONS, Chemists, Peterborough.

A JUNIOR or IMPROVER. About the end of July. A good opportunity for acquiring a knowledge of Dispensing. Arrangements might be made for him to attend lectures. Apply, giving usual particulars, and stating salary required, which must be moderate, to CHEMIST, 39, St. Paul's Rd., Canonbury, London, N.

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AT once.—A smart and active Junior ASSISTANT. One willing to do duty in light warehouse work, clerkship, &c., and occasionally to do duty in the Retail. Must be a good penman, and quick at accounts. State age, salary, where last employed, &c. Out-door. Address, TWEMLOW, Chemist and Medicated Lozenge Manufacturer, 91, Upper Brook St., Manchester.

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AN ASSISTANT to Manage a light Retail business. Must be well up in Counter Prescribing. Good references indispensable. Apply personally between 11 a.m. and 4 p.m., or by letter, stating age, experience, and salary required, A. H., 92, St. John's Rd., Hoxton.

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A COMPETENT ASSISTANT, of Christian principles. In-doors. Accustomed to a good-class Family and Dispensing business. Apply, stating references, salary required, and enclosing carte, which shall be returned, to J. L. CHAPLIN, Pharmaceutical Chemist, Wakefield.

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AN ASSISTANT, experienced in Dispensing and light Retail. Only 1 kept. Salary £50 in-door. Apply, R. HISCOCK, Chemist, Coventry.

AN ASSISTANT, about 23 years of age. Must be a good Dispenser and Counterman, and have unexceptionable references. To take second place. Apply to W. WARREN, 24, Russell St., W.C.

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ASSISTANTS WANTED.

IMMEDIATELY. — In-door. An active, pushing JUNIOR. Must be a good Salesman and have been accustomed to good-class trade. Apply, stating usual particulars, to GEO. S. HIGHMOOR, 46, Waterworks St., Hull.

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AN ASSISTANT, experienced in Dispensing and light Retail. Apply, stating age, height, references, salary required, and when disengaged, to H. JEFFERY, 110, Cheltenham Rd., Bristol.

IMMEDIATELY.—A Junior ASSISTANT, in a light Retail and Dispensing business. Must be an accurate Dispenser. Good references required. Apply to H. GOODALL, Derby, stating age, height, experience, and salary.

A JUNIOR, to assist in a light Retail and Dispensing business W. for a few hours daily. Good reference required. Liberal remuneration. Apply by letter only, with some particulars, S., care of Messrs. Sanger & Sons, Oxford St.

A JUNIOR ASSISTANT, competent to take charge in the absence of the principal, and requiring special advantages for study. Within easy distance of Bloomsbury Sq. Address, stating terms and references, enclosing carte (if out of town), to BETA, Meggeson & Co., Miles Lane, Upper Thames St. An IMPROVER also required.

APPRENTICE.—H. W. HARRIS, Pharmaceutical Chemist, Rochester, has a vacancy for a well educated and gentlemanly youth who has passed, or is prepared for, the Preliminary examination. Full particulars on application.

IMMEDIATELY.—A young man, for 5 or 6 weeks. Time for study. Apply personally, if possible, to POINGDESTRE & TRUMAN, Chemists, 187, Newington Butts, S.E.

A COMPETENT, managing, obliging ASSISTANT, equal to the duties of good country Retail and Dispensing business. Qualified, and who has had good and general experience. Liberal salary to suitable man. Apply, with fullest details, to F. CLARIDGE, Chemist, Warwick.

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IN a good-class Mixed country trade, a steady and obliging ASSISTANT, age about 23. Hours 8 to 8. No Sunday work. Comfortable home. References as to sobriety, &c., must be unexceptionable. Preference given to those enclosing photo., which will be returned. Salary, references, and particulars, to CHEMIST, 35 & 36, Market Pl., Olney.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 630.] SATURDAY, JULY 22, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

COUNCIL EXAMINATION PRIZES.

First Prize.—Pereira Medal in silver, and a present of books value £5, or thereabouts, given by Mr. T. H. Hills.

Second Prize.—The Pharmaceutical Society's Medal in silver, and a present of books value £3, or thereabouts, given by Mr. T. H. Hills.

Third Prize.—The Pharmaceutical Society's Medal in bronze, and a present of books value £2, or thereabouts, given by Mr. T. H. Hills.

The Examination for these prizes will be held in London and Edinburgh on Thursday, the 27th instant, at 10 a.m.

Pharmaceutical Chemists who have passed the Major Examination during the present Session, and who were Associates of the Society at the time of passing the Examination, are entitled to compete for the prizes.

Persons intending to compete must give notice of their intention to the Registrar, on or before Saturday, the 22nd instant, after which no further entries will be received.

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SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

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COVERS with strings to hold 26 numbers of the Journal may be obtained of the Publishers, Messrs. CHURCHILL, 11, New Burlington Street, W., price 2s. each.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in February, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Thursday, October 5th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

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INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, will commence on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

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Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

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20 ,,	9 ,,	17/6	20/	21/	23/	,,
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42 ,,	11 ,,	22/	25/6	26/6	30/	,,

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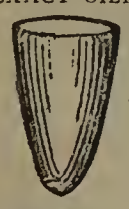

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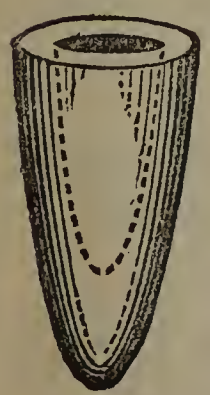

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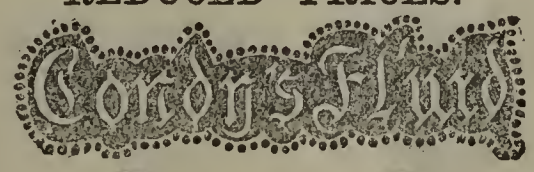

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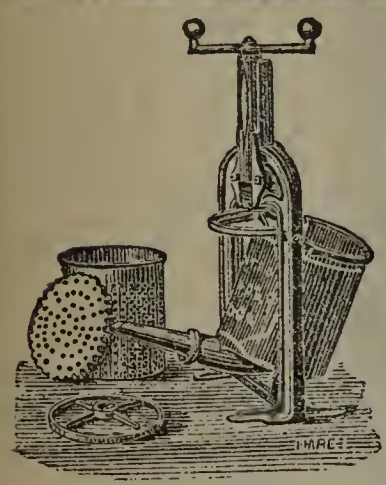

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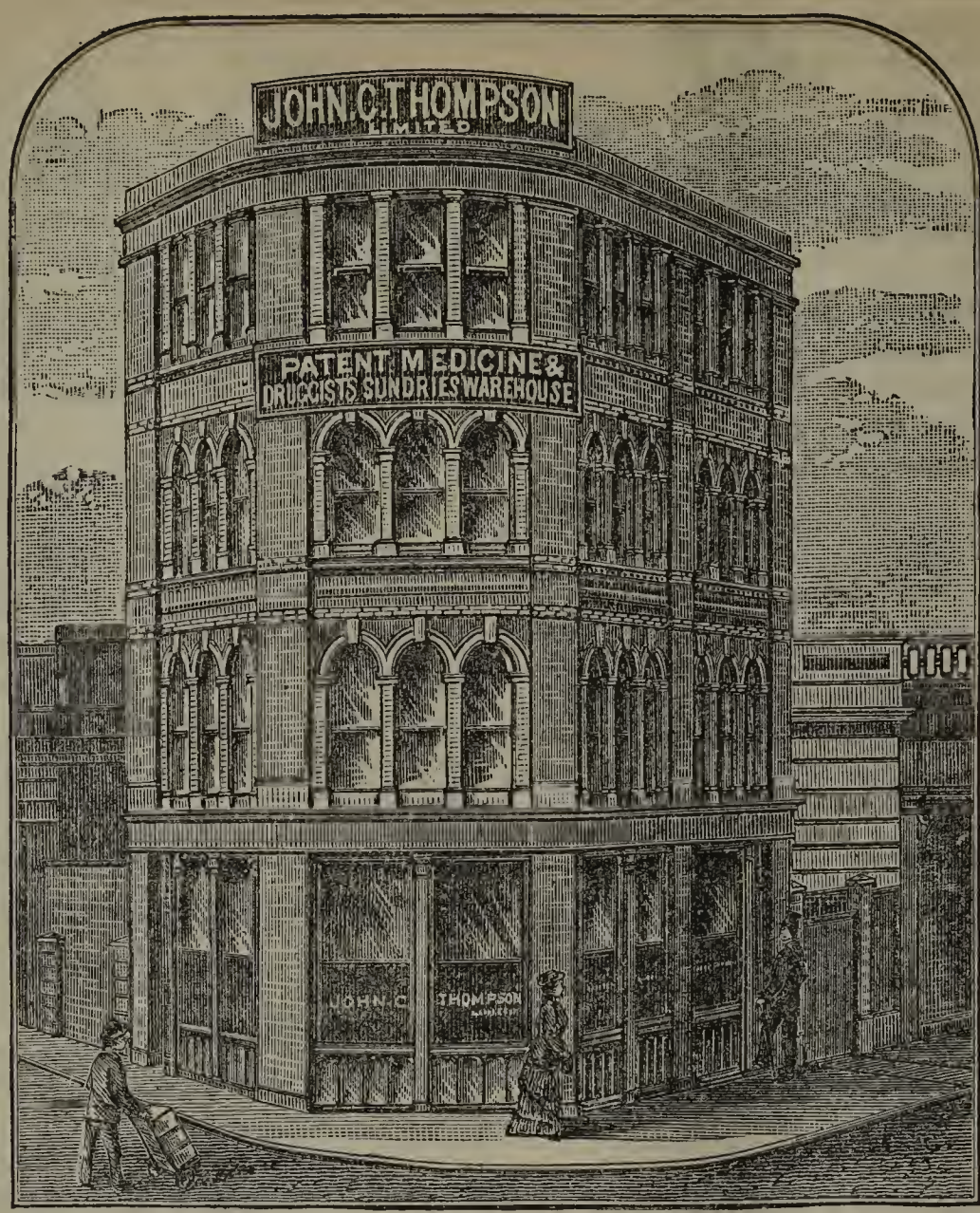

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NOTES ON THE PRODUCTION OF BENZOIC ACID AND BITTER ALMOND OIL FROM TOLUENE.*

BY A. T. JOB,

Student in the Laboratories of the Pharmaceutical Society.

The following notes are the results of a series of experiments conducted in the laboratories of the Pharmaceutical Society upon a process, recently patented by Dr. Emil Jacobsen, for the artificial production of benzoic acid and benzaldehyde from toluene.

A commercial sample of toluene was purified by successive redistillations at 111° C., rejecting all that came over below that temperature, and any that remained in the retort above that temperature.

The distillate thus obtained possessed the appearance of a clear mobile liquid, with a marked odour and powerful refractive properties. Its sp. gr. at 0° C. was 0·88.

In chemical composition toluene may be regarded as benzene, in which one of the hydrogen atoms is replaced by CH_3.

When toluene is treated with dry chlorine gas, two different series of products are obtained, depending upon the temperature. These differ both in their chemical and physical properties. Both series are represented by the same empirical formulæ, C_7H_7Cl, $C_7H_6Cl_2$, $C_7H_5Cl_3$, depending upon the amount of chlorine introduced. They are, in fact, isomeric bodies. As an explanation of this isomerism it is supposed that when chlorine is passed into cold toluene,—or even into hot toluene, if either iodine, molybdic chloride or antimonic chloride be present,—the chlorine is substituted in the benzene nucleus of toluene; but when chlorine is passed into heated toluene, the substitution takes place in the methyl or CH_3 group.

Toluene, $C_6H_5CH_3$.

Action of chlorine on toluene in the cold, substitution taking place in the benzene nucleus.	Action of chlorine on boiling toluene, substitution taking place in the methyl group.
$C_6H_4ClCH_3$	$C_6H_5CH_2Cl$
$C_6H_3Cl_2CH_3$	$C_6H_5CHCl_2$
$C_6H_2Cl_3CH_3$	$C_6H_5CCl_3$

This hypothesis is supported by the fact that when substitution products obtained by the action of chlorine upon cold toluene are treated with water, no benzaldehyde is formed; on the other hand, if the product formed by the action of chlorine upon boiling toluene be similarly treated, benzaldehyde is set free.

Such being the case a rational formula is required that shall indicate this. And inasmuch as all the bodies are chloro-substitution compounds of toluene, all are called chlorotoluenes. Beilstein and Kuhlberg have suggested a simple and graphic numerical method of indicating this, which is now generally adopted. It consists of figures indicating the number of atoms displaced in either group. Those displaced in the benzene group being represented by a numeral placed to the left of a horizontal line, and those in the methyl group by one to the left, thus

$C_6H_3Cl_2CH_3$	$C_6H_5CHCl_2$
Dichlorotoluene (2—0)	Dichlorotoluene (0—2)
(Methyldichlorobenzene)	(Dichloromethylbenzene)

Or, to express this in ordinary chemical terms, toluene being regarded as methylbenzene, the (2—0) dichlorotoluene would be called methyldichlorobenzene, whilst the (0—2) dichlorotoluene would be spoken of as dichloromethylbenzene.

The first step in the practical process is the formation of the required chlorotoluenes. Working experimentally after many trials, I found the following apparatus to give the most satisfactory results, small quantities of toluene being worked upon. A Bohemian flask of a capacity of about half a litre, and having a short wide neck, is fitted with a thermometer ranging above 215° C., a glass distillatory tube in connection with a Liebig's condenser, together with a straight tube for the introduction of the chlorine gas, which tube when fitted with a small thistle funnel also serves as a means of replacing the distillate back into the flask without in any way disturbing the cork or luting.

The chlorine before entering the flask is dried by passing through a wash bottle containing sulphuric acid.

The toluene is placed in the flask and heated over a shallow sand-bath; when it boils the chlorine is passed through it in a continuous stream, the action of the chlorine being accompanied by a rise in the temperature of the liquid.

When the thermometer indicates a constant temperature of 176° C. the distillate will be found to consist of monochloromethylbenzene, $C_6H_5CH_2Cl$, a colourless liquid with a very irritating odour.

Upon continuing the chlorination, the next body formed is the dichloromethylbenzene, $C_6H_5CHCl_2$, a colourless liquid with faint odour, boiling point 206° C.

By carrying on chlorination until no increase in weight on the part of the liquid in the flask takes place trichloromethylbenzene, $C_6H_5CCl_3$, is obtained; this is the third product of the action of chlorine upon heated toluene. It is a colourless liquid boiling at 215°–216° C.

From the two latter chlorotoluenes the benzaldehyde (bitter almond oil) and benzoic acid are respectively formed. For example, when heated in sealed tubes with water at 150° C. the following decompositions take place:—

$$C_6H_5CHCl_2 + H_2O = C_6H_5COH + 2HCl$$
$$C_6H_5CCl_3 + H_2O = C_6H_5COCl + 2HCl$$
$$C_6H_5COCl + H_2O = C_6H_5COOH + HCl$$

Benzoic acid and aldehyde may also be obtained from these substances by other reactions, thus by the action of alcoholic potash. These methods, however, as manufacturing processes, are of little value.

Jacobsen states in his patent that when benzodichloride (dichloromethylbenzene) is acted upon by glacial acetic acid in the presence of chloride of zinc the following reaction takes place, resulting in the formation of benzaldehyde, acetic chloride, and hydrochloric acid:—

$$C_6H_5CHCl_2 + CH_3COOH = C_6H_5COH + CH_3COCl + HCl.$$

He also states that the chloride of zinc in the above reaction may be replaced by oxide of zinc.

I found that upon placing together in a retort, molecular weights of dichloromethylbenzene and glacial acetic acid with oxide of zinc energetic action ensued. A liquid of a deep red colour distilled over which possessed a peculiar pungent odour, very different from that of bitter almond oil. On standing, crystals were deposited, and these were afterwards kindly analysed by Mr. Wyndham R. Dunstan, Demonstrator of Chemistry in these laboratories, and were found to be the acetyl derivative of benzaldehyde, their formulæ being $C_6H_5CH(C_2H_3O_2)_2$.

* The substance of two papers read before the School of Pharmacy Students' Association, June 15 and July 6, 1882.

Mr. Dunstan has suggested the following reactions to account for the formation of this substance.

In the first process anhydrous acetate of zinc being present it probably acts directly upon the dichloromethylbenzene, forming the acetyl derivative of benzaldehyde, thus—

$$Zn(C_2H_3O_2)_2 + C_6H_5CHCl_2 = C_6H_5CH(C_2H_3O_2)_2 + ZnCl_2.$$

In the second process, where chloride of zinc is present, this compound is most probably produced by a secondary reaction. The acetic chloride produced in the primary reaction decomposes the acetic acid with formation of acetic anhydride, thus—

$$CH_3COCl + CH_3COOH = (C_2H_3O)_2O + HCl.$$

The acetic anhydride then reacts upon the benzaldehyde—

$$(C_2H_3O)_2O + C_6H_5COH = C_6H_5CH(C_2H_3O_2)_2.$$

This acetyl derivative is decomposed by water, yielding benzaldehyde and acetic acid—

$$C_6H_5CH(C_2H_3O_2)_2 + H_2O = C_6H_5COH + 2HC_2H_3O_2.$$

It is therefore better after placing the substances together, and after heating for a short time, to add a little water at intervals. The benzaldehyde then distils over together with acetic acid. The distillate, now strongly acid, is neutralized by sodium carbonate, and allowed to stand, then redistilled; or the benzaldehyde may be separated from the solution of sodium carbonate by decantation and repeatedly washed with water until pure. Another method is to treat the neutralized distillate with solution of acid sodium sulphite, the aldehyde compound thus formed

$$C_6H_5CH{\cdot}OH{\cdot}SO_3Na$$

being decomposed by solution of sodium carbonate and freed from water by decantation.

In the preparation of benzoic acid a similar method is employed. The benzotrichloride (trichloromethylbenzene) is first heated over a water-bath with two molecular weights of glacial acetic acid in the presence of zinc chloride. The reaction takes place in two stages. Firstly, the acetic acid acts upon the trichloromethylbenzene, forming benzoic chloride, thus—

$$C_6H_5CCl_3 + CH_3COOH = C_6H_5COCl + CH_3COCl + HCl.$$

Then, secondly, the benzoic chloride acts upon more acetic acid, forming benzoic acid and acetic chloride, thus—

$$C_6H_5COCl + CH_3COOH = C_6H_5COOH + CH_3COCl.$$

After heating the retort for some time over the water-bath it is removed and any undecomposed acetic acid driven off by increasing the heat. The dark coloured residue in the retort is now treated with warm soda solution until alkaline, care being taken to avoid large excess of alkali. The precipitated zinc hydrate being removed by filtration and the filtrate evaporated to a low bulk, the benzoic acid is liberated from the benzoate of soda contained in the filtrate by acidulating with hydrochloric acid. Zinc oxide may be substituted for zinc in the above process.

This process is very satisfactory when once the trichloromethylbenzene has been obtained. This, however, is somewhat troublesome and tedious to prepare, a small quantity of toluene taking several days to chlorinate. It must also be practically free from the dichloromethylbenzene, otherwise the product will be contaminated with benzaldehyde and secondary reactions will also occur by which the yield of benzoic acid is considerably diminished. This difficulty overcome, the process bids fair to rival successfully all other methods for the artificial preparation of benzoic acid.

BLACK HELLEBORE ROOT.*

BY A. HERLANDT.

The rhizomes of *Helleborus niger* and *H. viridis* present in their external appearance a great similarity to those of other Ranunculaceæ, such as *Actæa spicata* and *Adonis vernalis*, and also, when in fragments or fine powder, in respect to odour and in a certain degree to taste, to the root of *Polygala Senega*. As the microscopic examination of rhizoma hellebori nigri reveals no characteristic peculiarities,—neither starch granules of a definite form, nor stone cells,—chemical reactions must be utilized for its recognition. The peculiar constituents of the two above-mentioned hellebore roots are two glucosides, helleborein and helleborin, which upon treatment with acids split up into helleboretin or helleboresin and sugar respectively. The blue-violet helleboretin can be used both pharmaceutically and forensically for the recognition of the rhizome.

If the comminuted rhizome of *Helleborus niger* be exhausted with boiling water, and the filtered decoction, after the addition of one-third of its volume of hydrochloric acid, be boiled, the clear liquid at first becomes quickly turbid and takes a peculiar violet colour. After cooling, a separation of blackish flocks takes place, and these, when washed upon a filter with ether, to remove yellow fatty and resinous matters, are of an intense and permanent violet colour.

The same result is obtained with the water in which the rhizome of black hellebore has been macerated. In both cases if the residue left on the filter be washed with alcohol, the alcohol acquires a violet colour, and leaves upon evaporation an amorphous greenish-violet substance, which is impure helleboretin. In the case of the rhizome of *Helleborus viridis*, the colour, after the action of the hydrochloric acid, comes out at first more greenish, probably because a larger quantity of fatty and resinous substances are present in it.

The rhizome of *Actæa* and the roots of *Polygala Senega* give, when treated in the same manner, no similar reaction, which would probably be the case with all drugs that do not contain helleboretin.

This reaction is obtained even with the use of five centigrams of rhizoma hellebori nigri. If it be cut into thin pieces, boiled with 10 c.c. of water, the decoction filtered and again boiled with one-third its volume of hydrochloric acid, the almost colourless liquid becomes after a few minutes turbid and bluish. If after cooling it be shaken with about half its volume of ether, a definite and permanent layer of blue-violet flocks forms between the two liquids. If the mixture be allowed to stand, the helleboretin dissolves gradually in the water, imparting to it an amethyst colour, whilst the ether remains colourless. Upon rendering the mixture alkaline by the addition of ammonia, the violet flocks become dirty yellow, but resume their original colour upon acidulating the liquid with hydrochloric acid. If sulphuric acid be used instead of hydrochloric acid in this reaction, the results do not appear so distinctly.

If instead of the rhizome an equal quantity of the rootlets be used, scarcely any traces of helleboretin can be distinguished, a point of some importance if, as the author appears to think, helleboretin is the active principle of the drug.

According to Chevallier there have been several cases of poisoning by black hellebore, and amongst others, one where two grams caused the death of an adult in eight hours; the evidence of the two following experiments that the helleboretin reaction can be used for chemical purposes will therefore be of interest.

In the first experiment 2 grams of finely chopped black hellebore rhizome was mixed with 100 grams of calves' liver, the mixture boiled with 200 c.c. of water, the decoction filtered, again boiled with hydrochloric acid, allowed to cool and filtered. The residue in the filter gave the helleboretin reaction most distinctly.

In a second experiment the decoction from 2 grams

* *Pharmaceutische Zeitung*, xxvii. 99.

of rhizome was mixed with 200 c.c. of beer. A portion of the mixture boiled with one-third of its volume of hydrochloric acid, allowed to cool and shaken with ether, gave, not violet, but dark brown flocks, showing that the foreign colouring matters in the mixture hindered the purity of the helleboretin reaction. The decoction, containing beer, was therefore precipitated with a solution of lead acetate and filtered, excess of lead separated by means of sodium phosphate, the liquid filtered and evaporated to one-half and precipitated with excess of tannic acid. The precipitate was decomposed with lead oxide in excess, the mixture then evaporated to dryness, and again taken up in boiling alcohol. The aqueous solution boiled with hydrochloric acid, cooled, and shaken with ether gave the helleboretin blue-violet flocks at the line of separation between the two liquids. The alcoholic solution left upon evaporation a yellowish-white residue formed of microscopic crystalline cauliflower-like aggregations, which were immediately coloured dark brown by concentrated sulphuric acid and were not altered by potassium bichromate. The alcoholic solution when diluted and shaken with ether gave a slight white precipitation at the line of separation between the two liquids.

THE ASSAY OF SPIRITUS ÆTHERIS NITROSI.*

BY PROFESSOR J. F. EYKMAN, OF TOKIO.

The so-called spiritus nitri dulcis is one of those remedies the normal constituents of which are not definitely ascertained, and for the assay of which no accurate method is known. Although the spirit is described in many chemical works as a simple solution of ethyl nitrite in alcohol, still none of the Pharmacopœias has a process according to which the resulting preparation would consist solely of ethyl nitrite and alcohol. Even when following the directions of the British and United States Pharmacopœias, where the use of copper prevents as much as possible the production of by-products, the product will never be entirely free from the latter. These by-products, mostly produced by oxidation of the alcohol, and among which are, primarily, aldehyde and acetic ether, and secondarily, common ether, ethyl formate and oxalate, cyanogen compounds, etc., occur in larger quantities when following the process of the Netherlands and German Pharmacopœias, where the alcohol itself serves as a means of reducing the nitric acid. Even when prepared according to the Codex Medicamentarius (Pharm. Gall.), the spirit contains a series of these by-products, among which are also found some less volatile ones, as glyoxal, glyoxylic acid, oxalic, malic, saccharic acids, etc. A difference in mode of preparation, however, not only alters the kind and quantity of by-products, but also the percentage of ethyl nitrite. Even when following one and the same process, a slight alteration in the *modus operandi* may essentially alter the qualitative composition and the percentage of ether. From this cause, as well as from the readiness with which ethyl nitrite changes by age, particularly in consequence of the considerable percentage of water in the spirit, or of exposure to light in only partly filled or not securely stoppered vessels, it will be understood how different samples of the spirit can show such different properties, particularly in the percentage of the ether, which is occasionally only present in traces, and sometimes even entirely absent.

It is to be regretted that not every Pharmacopœia demands the spirit to have a definite composition and a constant percentage of ethyl nitrite.

The Netherlands and German Pharmacopœias mention no such requirements. It is true both of them mention a definite specific gravity; but this is of little account so far as the percentage of ether is concerned, since both water and ethyl nitrite alter the specific gravity of alcohol in the same direction, namely, by increasing it. Even a greater or lesser amount of oxidation products, as aldehyde, is ignored by both Pharmacopœias, nor do they mention any method by which the presence of ethyl nitrite could be detected.

More detailed and exact in the description and properties are the British and United States Pharmacopœias. The latter requires that the spirit should contain 5 per cent. "of its peculiar ether," but gives no method for assaying it. On the other hand, the British Pharmacopœia says: "If it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, 2 per cent. of its original volume will separate in the form of an ethereal liquid,* and rise to the surface of the mixture.

It is clear that this test can only be applied to a spirit prepared according to the British Pharmacopœia, and cannot be used as a method of testing such as are prepared according to other processes, for instance, those of the Netherlands or German Pharmacopœias. In no case can the percentage of absolute ethyl nitrite be determined from the amount of the ether separated by calcium chloride, because the latter separates aldehyde, acetic ether, ether, etc., likewise. Besides, a preparation spoiled by age may be so manipulated by the addition of acetic or ordinary ether that it may respond to the above test without containing the required percentage of the true ether.

The different samples of spirit of nitrous ether, which have been examined in great number here, generally separate *nothing* when shaken with 2 volumes of a concentrated solution of calcium chloride. A few times from 2 to 5 per cent. was separated, and once 12 per cent., which latter should correspond to 20 per cent. of ethyl nitrite. These differences induced me to examine whether the layer separated by calcium chloride should always be regarded as ethyl nitrite. But the methods which, so far as I know, exist for the assay of ethyl nitrite in spiritus ætheris nitrosi all depend upon its decomposition (saponification) with potassa, and the assay of the resulting potassium nitrite,† and seem to me to yield unsatisfactory results, particularly when much of the above-mentioned by-products are present. I endeavoured, therefore, to find a process in which these by-products would not seriously interfere, and I believe that I have succeeded in finding one, as will be seen from the following description and analytical data.

In general, my method agrees with those proposed by Schloesing, Schulze, Wulfers, Reichardt, Tiemann, and others for the assay of nitric acid in well-water, etc. It depends on the determination of the volume of nitric oxide gas (NO), which is produced by decomposing ethyl nitrite by a ferrous salt, and is driven over and collected by distillation in an atmosphere free of oxygen.

The accompanying figure shows the apparatus used by me for my analysis. A is a flask of about 150 cubic

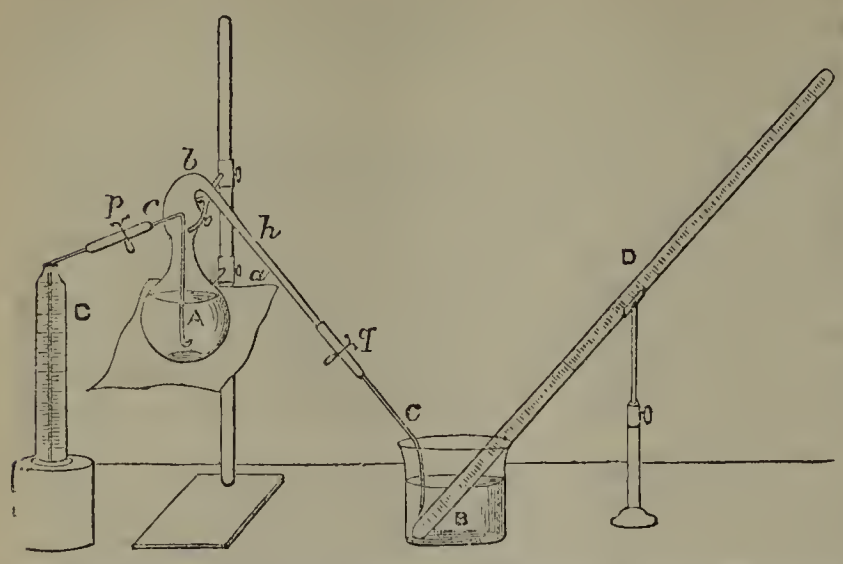
* Abstract of a pamphlet, entitled 'On Spiritus Ætheris Nitrosi.' Reprinted from *New Remedies*, May, 1882.

* A portion of it remains in the chloride of calcium solution. In Parrish's 'Treatise of Pharmacy' (1874), I found 4 per cent.; Tanner (*Jahresber. f. Pharmacog.*, 1871), Smith ('Commentary on the British Pharmacopœia') and others have 8 per cent., from which it appears that the preparation as officinal in England should contain 10 per cent. of the ether.

† In Hoffmann's 'Manual of Chemical Analysis,' a method is described, which consists in decomposing with potassa, diluting with water, and titrating the potassium nitrite, after acidulating with sulphuric acid, by means of solution of potassium permanganate of known strength, until this is no longer rendered colourless.

Rosenbladt recently published (*Zeitschr. f. anal. Chem.*, xvii., Heft 3) a method in which the spirit is saponified by alcoholic potassa in a closed tube, the alcohol driven off afterwards by evaporation, and the residue heated with a concentrated solution of chloride of ammonium in an apparatus filled with carbonic acid gas. From the volume of nitrogen given off, the quantity of ethyl nitrite is determined.

centimetres capacity. Through its neck passes a narrow (1 to 1·5 millimetres in bore) but thick-walled glass tube,



of which the leg inside the flask reaches nearly to the bottom of the latter, and is there curved over in nearly a right angle.*

The leg *c* is about 3 centimetres long, is joined by means of a short rubber tube, tied with cord, with a thin tube reaching to the bottom of the measuring cylinder C. Also the tube *c* is connected in a similar way with *h*, by means of a stout rubber tube, likewise tied with cord, of narrow diameter, and is curved at its lower end.

The other parts of the apparatus need no description. The beaker B and the measuring tube D are filled with soda solution of about 1·1 to 1·15 specific gravity. Instead of freeing the soda solution from oxygen by boiling, as is directed by Tiemann, I mixed it with a little solution of ferrous sulphate, in a closed flask, and poured the solution off after the ferric hydrate had settled.

Finally, there is required for the analysis a solution of a ferrous salt, acidulated with a little sulphuric acid, containing from 250 to 300 gm. of crystallized ferrous sulphate or 350 gm. of Mohr's salt. For shortness' sake, this solution will be indicated, in the following, by the letters *F. S.* Ferrous chloride and hydrochloric acid, which are preferable in the analysis of nitrates, are unsuited here, among other reasons, to prevent the formation of ethyl chloride, which would be produced by them when sweet spirit of nitre is distilled in their presence.

Before the tube *c* is dipped into the soda, the clamps *p* and *q* are to be opened and some of the F. S. (ferrous solution) contained in a beaker, which is put in place of the measuring cylinder shown in the cut, is made to enter the flask A. This may be easily effected by suction at the tube *a*, or the clamp *p* may be opened, and that at *q* be closed, and the flask be warmed until enough air has been expelled, when the F. S. will be sucked up into the flask on withdrawing the flame. After the flask has been about half filled with the F. S., *p* is closed, while the tube *c d* is still filled with liquid, and *q* is opened. The flask is now heated until the contents are at a brisk boil, when the end of the tube *c* is dipped into the soda solution and the boiling continued until no more bubbles of gas escape. As soon as this is the case, *p* is opened, and *q* is closed. This causes the soda solution to rise in the tube *c* up to the pinchcock, and, at the same time, the liquid still contained in *c d* is driven back into the beaker. During this last-named proceeding, the heat is moderated and regulated by the occasional withdrawal of the flame, so that the liquid recedes evenly and completely. About 5 to 10 cubic centimetres always remain in the flask, because the end of the tube does not reach completely to the bottom.

* As I had no flask of sufficiently fusible glass, I did not succeed in fusing the upper part *a b* to the flask, although the cut shows the latter to be one piece. I joined both portions with a thick rubber ring tied with twine.

Finally steam is given off; the lamp is then to be withdrawn, and the clamp *p* closed, whereupon the liquid is drawn up, from the beaker, into the tube *d* up to the clamp. The apparatus is now ready for a series of analyses. These are executed as follows:—

While the apparatus is deprived of air, 15 c.c. of F. S. are transferred to a narrow measuring cylinder (C) holding about 25·5 c.c. and graduated to 25 c.c. Next, 5 c.c. of dilute sulphuric acid are added, and, finally, 5 c.c. of the sweet spirit of nitre to be assayed.*

The cylinder, which is now almost full, is well closed, shaken a few times, and then allowed to stand for about five minutes. About 10 to 15 c.c. of F. S. is now allowed to pass into the flask, by opening the clamp *p*, and afterwards the mixture in the measuring cylinder, taking care to stop the flow when the level of the liquid approaches the bottom to prevent air from entering the flask. To the remnant a little F. S. is added, and nearly the whole of it again allowed to pass into the flask. This manipulation is repeated, finally substituting water for F. S., until the contents of the tube *c d* are filled with colourless water. The flask then contains about 70 c.c. of liquid.

After the measuring tube, filled with soda solution, has been immersed in the beaker B, the flask is heated, and, as soon as the rubber tube above the clamp *q* begins to bulge a little, *q* is slightly opened, taking care to immediately close it again if the soda solution should show inclination to ascend the tube further. This is to be repeated until the liquid is completely depressed, when the clamp *q* may be entirely opened. The developed nitric oxide (NO) gas is collected in the measuring cylinder, and the boiling is continued as long as gas-bubbles are given off; about five minutes' boiling is sufficient. After the evolution of gas ceases, *p* is opened and *q* closed. The contents of the flask then pass back into a beaker, and the apparatus is again ready for a fresh assay. Every analysis consumes about ten to fifteen minutes.

The collected gas is now to be treated as follows: By means of a capsule placed under the orifice, the measuring cylinder is transferred to a tall cylinder filled with cold water. The tube should be somewhat inclined so that the soda solution may easily run out of the tube and be displaced by water, without mixing with it. The tube is now to be closed with the finger, and by inclining it, the inner wall will be wetted by the water, so as to wash down any adhering soda solution. The tube is then entirely immersed in water. After the lapse of an hour, it is carefully lifted up until the water outside and inside of the tube occupies the same level, and the volume of gas then read off. The temperature of the water and the barometric pressure having been taken, the quantity of ethyl nitrite is calculated by aid of the following formula:—

$$\frac{V}{S \times a} \cdot \frac{H-e}{273+t} \cdot 0{\cdot}1207 = \text{per cent. of ethyl nitrite.}$$

(*V* represents the number of cubic centimetres of gas read off, *H* the barometric pressure in millimetres, *e* the tension of aqueous vapour at the observed temperature, *S* the specific gravity of the sweet spirit of nitre, *a* the number of cubic centimetres of the spirit used for assay, and *t* the observed temperature.)

For the purpose of controlling the correctness of this method, the following tests were made: The suitableness of the apparatus was first ascertained by distilling a weighed quantity of pure potassium nitrate, dissolved in a little water, with a saturated solution of ferrous chloride and hydrochloric acid. After the mixture of potassium nitrate and ferrous chloride had been sucked up, hydrochloric acid was used, in place of water, to wash the last remnants up. The following are the results:—

* If the spirit contains very much ether, take 17 c.c. of F. S. and 3 c.c. of the spirit; if it contains very little, take 10 c.c. of F. S. and 10 c.c. of the ether. The quantity of NO gas which is given off should be so adjusted that 20 to 30 c.c. of the measuring tube are still filled with soda solution.

Potassium nitrate used.	Yielded nitric oxide.	At temperature.	Barom. pressure.	Potassium nitrate found.
0·060	13·3 c.c.	7° C.	768 mm.	0·0588
0·120	26·4 „	9° C.	768 „	0·1159
0·120	26·55 „	9° C.	768 „	0·1166
0·1483	34·0 „	11·5° C.	761 „	0·1459

On comparing these results with those obtained by Eder,* who used Tiemann's apparatus,† it will be found that they entirely agree with them. The apparatus employed by me, however, has two advantages over that of Tiemann, namely:—1. By avoiding the use of a doubly-perforated rubber-stopper, there is greater assurance of the complete closure of the apparatus, and, therefore, a greater certainty of the correctness of every analysis. 2. A much smaller amount of time is required, since the apparatus is immediately again ready for a fresh analysis. It is, therefore, also much to be recommended for the execution of a series of *nitric acid* determinations.‡

To ascertain the influence exercised by the above-mentioned substances, *i.e.*, alcohol and its oxidation products, upon sweet spirit of nitre, nitric oxide gas, developed by heating potassium nitrite with ferrous sulphate, was passed into a solution of ferrous sulphate. Three separate portions of 10 c.c. of this solution, always freshly prepared, were distilled—the first by itself, the second with alcohol, and the third with a mixture of alcohol and aldehyde. The latter was obtained by distilling alcohol with potassium bichromate and sulphuric acid. The distillate, after being neutralized, is rectified and mixed with a little alcohol. The resulting liquid contained, besides other oxidation products, so much aldehyde that, after diluting with twenty times the volume of alcohol, a stronger reaction for aldehyde was obtained by heating with potassa than is found in strongly decomposed spirit of nitrous ether. The following figures were obtained:—

Without alcohol or aldehyde mixture.	With 10 c.c. of alcohol of 90 per cent.
I. 24·4 c.c. at 6° C. and 767 mm.	24·7 c.c. at 6° C. and 767 mm.
24·6 c.c. at 6° C. and 767 mm.	24·2 c.c. at 6° C. and 767 mm.
II. 18·6 c.c. at 6° C. and 767 mm.	18·8 c.c. at 7·5° C. and 767 mm.

Without alcohol or aldehyde mixture.	With 10 c.c. of alcohol and ½ c.c. of aldehyde mixture.
III. 22·6 c.c. at 7° C. and 766 mm.	22·0 c.c. at 7° C. and 766 mm.
22·0 c.c. at 7° C. and 766 mm.	22·2 c.c. at 7° C. and 766 mm.
IV. 31·2 c.c. at 8° C. and 768 mm.	30·7 c.c. at 8° C. and 769 mm.

These figures show that alcohol and aldehyde have but little influence upon the eliminated nitric oxide. I now prepared a small quantity of ethyl nitrite in order to ascertain whether the reaction took place quantitatively according to the following scheme:—

$$2\,C_2H_5.NO_2 + 2\,FeSO_4 + H_2SO_4 =$$

ethyl nitrite + ferrous sulphate + sulphuric acid

$$= Fe_2(SO_4)_3 + 2\,C_2H_5.OH + 2\,NO.$$

ferric sulphate + alcohol + nitric oxide

The ethyl nitrite was obtained by distilling a mixture of alcohol, sulphuric and nitric acids with copper. The mixture was heated to 71° to 75° C.; the vapours passed first through an empty flask, were next washed with a solution of calcium chloride, and afterwards condensed in a Liebig's condenser. The distillate was caught in a receiver cooled with ice, and afterwards three times shaken with about five times its volume of water. The separated ether having been allowed to stand a few days in contact with unslaked lime, it was then distilled in a fractional distillation apparatus with Linnemann's tube. The portion passing over at 19° C. was again shaken with ten volumes of water, the separated ether again dried over lime, and once more fractionated. This gave a product boiling at 18° C. and 768 mm., which was used for the following assays.

I. 2·4695 gm. were dissolved in 90 per cent. alcohol, to measure 100 c.c. Five c.c. of this solution, corresponding to 0·12347 gm. of the pure ether ($C_2H_5.NO_2$), yielded—

a. 37·75 c.c. NO, at 15° C. and 762 mm.
b. 37·68 „ „ „ „

corresponding to 0·11843 gm. of the ether, thus showing a loss of 0·00504 gm. At one time the gas was collected over mercury. After allowing ferrous chloride to pass up through it, there remained unabsorbed, at 10° C. and 762 mm., 0·45 c.c.

II. 1·2365 gm. were dissolved in 90 per cent. alcohol, to measure 100 c.c. Five c.c. of this solution, corresponding to 0·061575 gm. of the pure ether, yielded—

a. 19·2 c.c. NO, at 13° C. and 759 mm.
b. 18·95 c.c. „ „ „ „
c. Mixed with 1 c.c. of aldehyde mixture, 19 c.c. NO, at 13° C. and 759 mm.

} = 0·05993 gm. of the ether, showing loss of only 0·0017 gm.

III. 5·993 gm. were diluted with 90 per cent. alcohol to 250 c.c. portions of 10 c.c. each, of this solution, were analysed according to Hoffmann's and Rosenbladt's method, and one portion of 3 c.c. was analysed according to my own method (the results are calculated for 10 c.c. to permit ready comparison with the others). Here are the figures:—

Method.		Amount of ether taken.	Temperature C°.	Pressure mm.	Consumed permanganate *	Yielded gas in c.c.	Amount of ether found.	Loss.
Hoffmann's	1	0·23971	—	—	25·4c.c.	—	0·204	0·0357
	2	0·23971	—	—	21·7c.c.	—	0·175	0·0647
Rosenbladt's	3	0·23971	8°	752	—	58·3 N_2	0·1888	0·0509
	4	0·23971	8°	752	—	57·8 N_2	0·187	0·0527
	5	0·23971	9°	752	—	49·8 N_2	0·161	0·0787
	6	0·23971	10°	761	—	68·8 N_2	0·211	0·0287
Eykman's	7	0·23971	6°	764	—	21·55NO	0·[illegible]372	0·0025
	8	0·23971	6°	764	—	21·9 NO		

The last series of assays was repeated, with the addition of 25 per cent. of aldehyde mixture when using my own method, and only 10 per cent. with the others. The results were:—

a. Hoffmann's Method.

Ten c.c. of the alcoholic solution and 1 c.c. of the aldehyde mixture consumed 55 c.c. of the permanganate, and still the latter lost its colour.

* *Zeitschr. f. anal. Chem.*, xvi., 300.

† W. Kubel, *Anleitung zur Untersuchung von Wasser.* Zweite Aufl. v. Tiemann.

‡ To assay the nitric acid in cuprum aluminatum, 0·25 gm. are dissolved in a few c.c. of water, and distilled with a concentrated solution of ferrous chloride or of Mohr's salt (ammonio-ferrous sulphate) in hydrochloric acid.

* 1 c.c. of permanganate solution corresponds to 0·008052 gm. of pure ethyl nitrite.

b Rosenbladt's Method.

The same mixture yielded, at 10° C. and 763 mm. pressure, the following quantities of nitrogen gas:—

		Pure ether.	Loss.
a. 40·8 c.c. correspond to		0·1312	0·1085
b. 39·3 „	„	0·1260	0·1137
c. 21·8 „	„	0·0700	0·1697
d. 24·2 „	„	0·0778	0·1619

c. Eykman's Method.

A mixture in the same proportion at 8° C. and 765 mm., yielded—

		Pure ether.	Loss.
a. 21·4 c.c. correspond to		0·2331	0·0066
b. 21·7 „	„	0·2331	

Calculated per 100 c.c. of the solution, or 2·3971 gm. of the pure ether, the loss incurred by the three methods is, therefore, as follows:—

	Without aldehyde.	With aldehyde.
Hoffmann . . .	15–27 per cent.	? ?
Rosenbladt . . .	12–32 „	45–70 per cent.
Eykman	1·5–4 „	2·5 „

From these results I am justified in believing that neither Hoffmann's nor Rosenbladt's methods are useful processes on account of the interference of the oxidation products of alcohol.

I append a selection of analyses of spirit of nitrous ether, taken from a number executed by my process.

Prepared according to Pharmacopœia.	Sp. gr.	When shaken with 2 vols. sol. of $CaCl_2$, there is separated.	Result of analysis upon 5 c.c.	Per cent. of pure ether.
1. Netherl. (fresh).	0·845	nothing.	20·2 c.c. NO at 8° and 769 mm.	1·56
2. Netherl. (fresh).	0·844	nothing.	26·4 c.c. NO at 9° and 769 mm.	2 04
3. Netherl. (fresh).	0·851	nothing.	32·0 c.c. NO at 10° and 769 mm.	2·44
4. Netherl. (old)	0·856	nothing.	4·9 c.c. NO at 8° and 769 mm.	0·37
5. U. S. (fresh).	0·837	—	41·2 c.c. NO at 8° and 769 mm.	3·22
6. U. S. (fresh).	0·838	nothing.	24·4 c.c. NO at 6·5° and 769 mm. 24·6 c.c. NO at 6·5° and 769 mm.	1·92
7. U. S. (old)	0·842	nothing.	17·6 c.c. NO at 8° and 769 mm.	1·37
8. Brit. (fresh).	0·845	p.c.p.c. 2=10 ether.	38·1 c.c. NO at 6° and 769 mm.	2·94
9. ?	0·855	4=12 „	44·9 c.c. NO at 9° and 765 mm.	3·4
10.	0·856	12=20 „	48 2 c.c. NO at 6° and 771 mm.	6·2

It also appears that the ether which is separated from the spirit by shaking with two volumes of a saturated solution of chloride of calcium consists only *in part* of ethyl nitrite. From about 50 c.c. of the latter separated by calcium chloride, I succeeded in extracting a few c.c. of pure acetic ether and a little ether. The liquid had not entirely distilled over when it had reached the boiling point of alcohol; the largest part distilled at above 25° C., and only a few c.c. could be collected at a temperature of 18° C.

THE CONSTITUTION OF ALBUMENOIDS.*

The following passages are taken from an interesting report upon albumenoid matters which has recently been presented by M. Dumas to the Academy of Sciences, based upon a communication from M. Béchamp.

Among the most interesting and least known of organic substances are those which are designated under the common name of albumenoid or gelatinigenous matters, which are either liquid and coagulable, as white of egg, blood serum, and the fibrous principle of the flesh of animals, or tissues that may be converted into gelatine, as well as gelatine itself. Not being volatile or crystallizable they are most difficult to define, and just as it might be believed that we had to do with a well characterized species the substance proves to be a mixture of two or more different bodies.

The distinctive specific properties of these bodies are therefore not yet well known; there are obscure points in respect to their elementary composition; the products resulting from the action of energetic reagents upon them are complex, whilst all the formulæ by which it has been attempted to represent their composition have proved so complicated that it is difficult to lay hold of the bond connecting them with the ordinary equations of organic chemistry which have been studied with success in recent years. Such considerable efforts have, however, been made, and science has been for some time past enriched with results so worthy of attention, that the not very distant discovery of the true constitution of these substances,—which appear to be direct instruments of life,—may be considered possible and even probable, as well as the precise definition of their specific constituents.

Although these matters do not crystallize or volatilize or form well-defined combinations with bases or acids, they possess one character which is constant and distinctive, and that is the action that bodies of this nature exercise upon the plane of polarized light. In studying various albumenoid matters under this aspect M. Béchamp has succeeded in separating them into species which, if not absolutely defined and comparable to those represented by volatile or crystallizable substances, at least present the results of the first serious attempt towards a regular classification of these interesting products.

In order to appreciate the importance of this inquiry it is sufficient to recall the fact that the organs of all animals and the liquids bathing them are formed of or contain such matters, and that if they do not constitute the preponderating materials in the tissues and juices of plants, their presence in them does not seem to be less general or less essential, especially at the commencement of cell formation. If it be added that analyses of these substances and their interpretation have led chemists to admit that their molecule contains not less than from five to six hundred atoms of carbon, hydrogen, oxygen or nitrogen, it will be understood what a distance separates these bodies from those much less complex ones, the study of which has served as a foundation for the doctrines upon which systematic organic chemistry rests.

The first question to resolve in connection with this group of bodies consists in breaking up the mixtures in which they occur in nature and isolating those individuals possessing fixed and sufficiently fundamental properties to warrant their being considered specific and essential.

White of egg contains at least three bodies: one precipitable by subacetate of lead; a second by ammoniacal subacetate of lead; and a third which is not coagulable by heat, and is soluble in water and insoluble in alcohol, by which means it is separable from an aqueous solution. The first two of these substances present the general characters of albuminoid matters; the third belongs to the class of ferments and liquefies starch.

The ferment discovered in the white of egg by M. Béchamp explains some of the phenomena which occur during incubation. Its presence there caused him to look for it in other albuminoid products, and a general idea of his work may be given by saying that he has succeeded in breaking these up into two or three distinct substances, possessing the properties of albumenous products, and a well defined ferment. The question arises, for what purpose are all these albuminous liquids accompanied by these ferments? What relation exists between the abundance of coagulable animal matter, destined apparently to furnish materials for the building up of organs, and the small quantity of these ferments the presence of which appears to indicate the approaching destruction of the

* *Journal de Pharmacie*, [5], vi., 8.

unstable compounds with which they are associated? Whence do these ferments come, what becomes of them, and what part do they play? Such questions are certainly of considerable interest; for these ferments are observed in the serum of the blood of all animals, in the white and the yelk of eggs, and in milk; that is in all liquids destined for the formation or reparation of the organs of animals.

Long ago, Thenard, recognizing the singularly destructive action exercised upon peroxide of hydrogen by certain bodies, such as divided silver, was led to compare their manner of action in this case with that of ferments. In fact the analogy is striking between beer yeast, which in the presence of sugar destroys it and converts it into alcohol and carbonic acid, and fibrin, which converts peroxide of hydrogen into oxygen and water. Neither beer yeast nor fibrin appears to operate in virtue of a chemical action or it would have a part to play. But yeast operates in virtue of a vital phenomenon: would this be the case with fibrin? Of this we are ignorant, and although our ideas upon the subject of ferments have been much modified since the investigation of peroxide of hydrogen by Thenard, we are not yet in a position to explain how fibrin decomposes peroxide of hydrogen apparently without borrowing anything from it or yielding anything to it.

This question, the interest of which has not escaped physiologists, has been advanced a step by M. Béchamp. The fibrin of the blood and the oxygen condensed in the globules may possibly have a part to play in the complex phenomena of respiration allied to this singular action upon peroxide of hydrogen which no other animal matter exhibits. M. Dumas states that he himself formerly sought unsuccessfully to ascertain whether arterial blood contained peroxide of hydrogen, but he would not be surprised if some more able experimenter were to detect its presence.

When fibrin is treated with dilute hydrochloric acid it swells and the greater portion of it dissolves; but as recognized by M. Bouchardat there is always an insoluble residue. M. Béchamp has demonstrated that it is in this residue that the decomposing action in respect to peroxide of hydrogen is found and not in the soluble portion that is removed by hydrochloric acid.

The granular substance insoluble in hydrochloric acid is still an albumenoid matter, possessing the general properties of albumenoids. When heated to boiling in water it loses its decomposing power upon peroxide of hydrogen. If dried in a vacuum in the cold it, on the contrary, retains the power. The same happens when it is treated with alcohol and ether; a little fatty matter is removed without modifying its decomposing power. When this singular substance has been well prepared its action upon peroxide of hydrogen is as rapid as that of the metallic oxides.

It may be mentioned that in a subsequent communication to the Academy* Messrs. Bert and Regnard confirm M. Béchamp's statement that the power of decomposing peroxide of hydrogen resides in the portion of fibrin not dissolved in dilute hydrochloric acid. They further state that if fibrin be converted into peptone by artificial digestion it is no longer capable of decomposing peroxide of hydrogen, but that this property is not affected by putrefaction. Another observation of these experimenters, that in every case an organized ferment, such as beer yeast, is immediately destroyed by contact with peroxide of hydrogen, whilst soluble ferments, such as diastase and the gastric and pancreatic juices, are not affected by it, may give a clue to the nature of the ferment associated with fibrin.

The memoir of M. Béchamp contains the results of his attempts to separate definite substances from various albumenoid matters, and enumerates the various ferments that he has found associated with them as well as their properties.

* *Comptes Rendus*, xciv., 1382.

SULPHOPHENATE OF QUININE.*

BY S. ZINNO.

The author first discusses the question as to whether "sulphophenate" or "phenosulphate" is the better name for this salt, and decides in favour of the former, for the more stable and important of the atomic groups forming the double acid is the sulphuric molecule. The acid from which this salt is formed is a substitution product of sulphuric acid in which one of the hydrogen atoms is replaced by a molecule of phenyl, thus $\left.\begin{matrix} H \\ C_6H_5 \end{matrix}\right\} SO_4$.

This salt appears to have been first prepared by Prota-Giurleo and analysed by Signor Zinno in 1870, although Rademaker is generally stated to have been the discoverer. It is a true chemical compound and possesses all the chemical and physical characteristics of a definite body. It contains 52 per cent. of quinine, 20 per cent. of sulphophenic acid, and 28 per cent of water of crystallization.

Sulphophenic acid is made by treating phenol with excess of strong sulphuric acid, allowing the mixture to remain for twenty-six hours. It is then diluted with water and saturated with barium carbonate, filtered and evaporated, the resulting barium salt being purified by recrystallization from alcohol; it is then decomposed by sulphuric acid, and the liberated sulphophenic acid added to an equivalent proportion of the alkaloid. Or the crude acid may be saturated with carbonate of lead, filtered, and the resulting solution of sulphophenate of lead decomposed with quinine. The salt is very difficult to crystallize and should be dispensed in the form of an accurately titrated solution.

The salt is being much used in Italy in medical practice, and its efficacy is highly spoken of by the author.

THE PREPARATION OF SYRUPS FOR AERATED BEVERAGES.†

In the preparation of syrups, which are solutions of sugar, more or less strong according to the object for which they are used, care should be taken to employ only the best refined sugar, and either distilled or filtered rain water, as they will be rendered much less liable to spontaneous decomposition, and become perfectly transparent without the trouble of clarifying. When, however, impure sugar is employed, clarification is always necessary. This is best done by dissolving the sugar in the water or fruit juices cold, and then beating up a little of the cold syrup with some white of egg and one or two ounces of cold water, until the mixture froths well; this must be added to the syrup in the boiler, and when the whole is frisked up to a good froth, heat should be applied, and the scum which forms removed from time to time with a clean skimmer. As soon as the syrup begins to simmer it must be removed from the fire and allowed to stand until it has cooled a little, when it should again be skimmed, if necessary, and then passed through a clean flannel. By using refined sugar, however, all this trouble of clarification can be avoided.

When vegetable infusions or solutions enter into the compositions of syrups, they should be rendered perfectly transparent by filtration or clarification, before being added to the sugar.

The proper quantity of sugar for syrups will, in general, be found to be two pounds avoirdupois to every pint of water or thin aqueous fluid. These proportions allow for the water that is lost by evaporation during the process, and are those best calculated to produce syrup of proper consistence and possessing good keeping qualities. They closely correspond to those recommended by Guibourt for the production of a perfect syrup, which, he says, consists of 30 parts of sugar to 16 parts of water.

In the preparation of syrup it is of great importance to employ as little heat as possible, as a solution of sugar,

* From the *Annali di Chimica*, lxxiv., 282.
† From the *Chicago Confectioner*.

even when kept at a temperature of boiling water, undergoes slow decomposition. The best plan is to pour the water (cold) over the sugar, and to allow the two to lie together for a few hours, in a covered vessel, occasionally stirring, and to apply a gentle heat, preferably that of steam or of a water-bath, to finish the solution. Syrups are sufficiently boiled when some taken up in a spoon pours out like oil, or a drop cooled on the thumb nail gives a proper thread when touched. When a thin skin appears on blowing the syrup, it is judged to be completely saturated. These rude tests, however, often lead to errors, which might be easily prevented by employing the proper proportions, or determining the specific gravity by immersing in the syrup one of Baumé's saccharometers or syrup gauges, as indicated in the following table:—

Sugar in 100 parts.	Sp. Gr.	Deg. Baume.
0	1·000	0
5	1·020	3
10	1·040	6
15	1·062	8
20	1·081	11
25	1·104	13·5
30	1·128	16·3
35	1·152	19
40	1·177	21·6
45	1·204	24·5
50	1·230	27
55	1·257	29·5
60	1·284	32
67	1·321	35

A fluid ounce of saturated syrup weighs 577½ grains; a gallon weighs 13½ pounds; its specific gravity is 1·319 to 1·321 or 35° Baumé; its boiling point is 221° F., and its density at the temperature of 212° is 1·260 to 1·261, or 30° Baumé. The syrups prepared with the juices of fruits mark about two or three degrees more on Baumé's scale than the other syrups. According to Ure, the decimal part of the number denoting the specific gravity of a syrup multiplied by twenty-six gives very nearly the number of pounds of sugar it contains per gallon.

The preservation of syrups, as well as of all saccharine solutions, is best promoted by keeping them in a moderately cool, but not a very cold place. Let syrups be kept in vessels well closed, and in a situation where the temperature never rises above 55° F. They are kept better in small than in large vessels, as the longer a bottle lasts the more frequently will it be opened, and the syrup consequently exposed to the air. By bottling syrups while boiling hot, and immediately corking down and tying the bottles over with a bladder, perfectly air-tight, they may be preserved even at a summer heat for years, without fermenting or losing their transparency.

The candying of syrups may be prevented (unless the syrup be over-saturated with sugar) by the addition of acetic or citric acid, two or three drachms per gallon. Confectioners add a little cream of tartar to the syrup to prevent granulation. Syrups may be effectually prevented from fermenting by the addition of a little sulphite of potassa or lime; also by the use of salicylic acid in small quantities. Fermenting syrups may be immediately restored by exposing the vessel containing them to the temperature of boiling water. The addition of a little spirit is also good, say about ten per cent.

A solution of sugar prepared by dissolving two parts of double refined sugar in one of water, and boiling this a little, affords a syrup which neither ferments nor crystallizes.

The basis of most mineral water syrups is simple syrup, which is prepared by adding sixteen pounds finest white sugar and the whites of four eggs to one gallon of water; stir until all the sugar is dissolved; simmer over a gentle heat for two or three minutes; skim well and strain through a fine flannel bag.

The best way to keep fruit syrups from fermenting is by bottling while hot, into suitable bottles or larger vessels, and to prevent access of air. This is the principle, and it may be carried out in various ways. For instance, fill the syrup while hot in quart bottles, previously warmed, and fill them almost full. Cover or cork the bottles temporarily until the syrup cools a little and contracts in volume; then, having heated a small quantity of the syrup, refill the bottles, cork them securely and wax them.

A great variety of syrups are made by the addition of proper flavouring ingredients to simple syrup; but in other cases, especially when the juices of fruits are employed, the syrup is not first prepared and then flavoured, but the processes go hand-in-hand. In such instances specific instructions will be given. It is always advisable, when fresh fruit can be obtained, to use it in preference to the essence. One general recipe, which answers for nearly all fresh fruit, is as follows: Use nothing but the very best fresh fruit, which must be freed from stocks, etc., and crushed with a wooden instrument (not metal); when well mashed, let it stand in a room of even temperature (about 68° F.) for four days, which will give sufficient time for fermentation to take place; press out the juice from the fruit and let it settle in a cool cellar for two days, after which five pounds of the clear juice is to be simmered with nine pounds of loaf sugar; while warm, strain through flannel. The colour may be improved by a solution of some colouring agent.

It is advisable to add to the fresh fruit before setting it for fermentation, about 2 pounds of powdered loaf sugar for every 100 pounds of fruit. When cold it is ready for bottling. Cleanliness should be strictly observed in all the utensils used. When bottling for storing, skim the top off any floating matter from the syrups in the large pan, and see that no residue at the bottom goes into the bottles. Most of the syrups not made of fruit, may have a little mucilage of gum arabic added, in order to produce a rich froth. The following recipes comprise syrups made from the fruit, and also from essences. These may be varied to suit taste and requirements. A variety of syrups have been brought into use by adding the various wines, such as claret, hock, sherry, etc., to simple syrup; others, by the addition of spirits, as milk punch, by adding to vanilla cream Jamaica rum and nutmeg. Almost any syrup may be made by the addition of a sufficient quantity of flavouring essence to simple syrup; but these artificially prepared syrups are inferior to those made from fresh fruits.

Red Colouring for Soda Water Syrups.—The most convenient is probably tincture of cudbear, as it affords a good, substantial, and natural-looking colour miscible with syrups without cloudiness. It may be made as follows:—Two to 4 ounces powdered cudbear, 1 pint diluted alcohol. Exhaust by maceration or displacement. Used alone, the tincture gives a shade of red closely imitating the colour of raspberries or currants. For deeper red, like blackberries, the addition of some caramel is all that is necessary. The strawberry colour is best imitated with tincture of cochineal. *Aniline red*, owing to its cheapness, is often used for colouring syrups, but it produces a glaring, artificial-looking bluish-red, and is liable to the objection that it sometimes contains arsenic.

Ambrosia Syrup.—A mixture of equal parts of vanilla and strawberry syrups.

Apple Syrup.—Proceed with apples as for pine-apple syrups.

Banana Syrup.—Proceed with bananas as for pine-apple syrups.

Blackberry Syrup.—Prepared from ripe fruit the same as raspberry syrups. Blackberry syrup is improved by adding 1 ounce best French brandy to each quart.

Capillaire Syrup.—Nine pounds loaf sugar, 5 pounds orange-flower water. Boil till the sugar is dissolved and the syrup is clear; while hot, strain through flannel

add to the cool syrup 2 drachms of tartaric acid, previously dissolved in 8 ounces of the strongest orange-flower water; lastly add 4 ounces of the best Rhine wine.

Cream Syrup (2).—One pint condensed milk. One pint water. One and one-quarter pound sugar. Heat to boiling and strain. This will keep for over a week in a cool place.

Cream Syrup—Imitation.—Make an emulsion with 3 ounces fresh oil of sweet almonds, 2 ounces powdered gum arabic and 2 ounces water; then dissolve 1 pound white sugar by gentle heat, strain, and when cool, add the whites of two eggs. It should be put up in small bottles, well corked, in a cool place. This is not only an excellent imitation and substitute for cream syrup, but will keep for a considerable time.

Currant Syrup (1).—Six pints simple syrup. Two pints water. Two ounces tartaric acid. Three drachms fruit essence. Mix; colour with liquid carmine for red currants, and with burnt sugar, for black.

Currant Syrup (2).—One pint red currant juice. One gallon simple syrup.

Grape Syrup.—One half pint brandy. One ounce tincture of lemon. One gallon simple syrup. Tincture red saunders, 1 quart.

Ginger Syrup.—Six pints simple syrup. Two pints water. One ounce tartaric acid. Two ounces ginger. Burnt sugar to colour.

Ginger Syrup (2).—Four ounces extract Jamaica ginger. One gallon syrup. Shake well. A few drops of tincture curcuma to colour.

Ginger Syrup (3).—Nine pounds loaf sugar. Five pounds water. Twelve ounces essence ginger. Four ounces Rhine wine. Boil sugar and water until dissolved and clear; when cool, add ginger and wine. Mix well and let settle.

Imperial Syrup.—Equal parts of raspberry and orange syrups.

Lemon Syrup.—Grate off the yellow rinds of lemons, and beat it up with a sufficient quantity of granulated sugar; express the lemon juice; add to each pint of juice 1 pint of water, 3½ pounds granulated sugar, including that rubbed up with the rind; warm until the sugar is dissolved and strain. Under no circumstances must the syrup be allowed to boil, and the less heat that can be used to effect the complete solution of the sugar the better will be the syrup.

Lemon Syrup (2).—Add to 1 gallon simple syrup when cold, 20 drops fresh oil lemon and ½ ounce citric acid, previously dissolved in 3 ounces water; mix by shaking well in a bottle; add 4 ounces gum solution, made by dissolving 2 ounces of fine white gum arabic in 2 ounces warm water.

Lemon Syrup (3).—Six pints simple syrup. Two pints distilled water. Two ounces essence lemon. Two ounces citric acid, dissolved in boiling water. Mix, and, if required, colour with saffron.

Maple Syrup.—Three and one-half pounds maple sugar. One quart water. Dissolve, and, if desired, add a small proportion of gum solution to produce a rich froth.

Milk Punch Syrup.—To 1 pint heavy syrup add one-half pint each of brandy and Jamaica rum; flavour with two teapoonfuls of an extract prepared by macerating 2 ounces of ground nutmegs in 8 ounces of alcohol. The syrup is first to be poured into the glass in the proper quantity, and ordinary cream syrup added before drawing the soda water.

Mulberry Syrup.—Made from the fruit, the same as strawberry, and acidulated slightly with a solution of citric acid. It may also be made from the fruit essence in the same manner as for strawberry, using about half the quantity of tartaric acid.

Nectar Syrup (1).—One ounce extract vanilla. One ounce extract rose. One ounce extract lemon. One ounce extract bitter almonds. Mix and add 1 gallon simple syrup; colour pink with cochineal.

Nectar Syrup (2).—Mix 3 parts vanilla syrup with 1 each of pineapple and lemon syrups.

Orange Syrups.—These may be made from the fresh fruit or from the essence in a similar manner as for lemon syrups. Orange syrups may be coloured slightly with tincture of saffron or of turmeric.

Orgeat Syrup (1).—One half pint of cream syrup. One half pint simple syrup. One pint vanilla syrup. Five drops oil bitter almonds.

Orgeat Syrup (2).—Beat to an emulsion in a mortar 8 ounces blanched sweet almonds and 4 ounces bitter ones, adding a little water; when smooth add 3 pints water; mix and strain; dissolve in this without heat 6 pounds sifted white sugar, and 4 ounces fresh orange-flower water.

An excellent imitation of orgeat syrup is made by flavouring cream syrup, made with eggs and milk, with a few drops of oil of bitter almonds.

Pear Syrup.—Proceed with pears as for pineapple syrups.

Pineapple Syrup (1).—Take a convenient number of the fruit; pare and mash them in a marble or porcelain mortar, with a small quantity of sugar; express the juice; for each quart of juice take 1½ pint of water, and 6 pounds of sugar; boil the sugar and water, and add the juice; remove from the fire; skim and strain.

Pineapple Syrup (2).—Six pints simple syrup. Two pints distilled water. One ounce tartaric acid. One drachm essence pineapple. Saffron to colour.

Pineapple Syrup (3).—Proceed as for raspberry (4); but the hard nature of this fruit requires pounding with a heavy chump of wood (not metal) in a tub with a strong bottom; when well mashed it will require great pressure to extract all the juice from this fruit; a cider press will answer the purpose; add 14 pounds of sugar to a gallon of juice and a little pure acetic acid; put it on a slow fire, and stir until the sugar dissolves; when cold, bottle and tie down.

Raspberry Syrup (1).—Take fresh berries and inclose them in a coarse bag; press out the juice, and to each quart add 6 pounds white sugar and 1 pint of water; dissolve, raising it to the boiling point; strain; bottle and cork hot, and keep in a cool place. Raspberry syrup is improved by adding 1 part of currants to 4 parts of raspberries.

Raspberry Syrup (2).—Five quarts raspberries. Twelve pounds white sugar. One pint water. Sprinkle some of the sugar over the fruit in layers, allowing the whole to stand for several hours; express the juice and strain, washing out the pulp with the water, add the remainder of the sugar and water; bring the fluid to the boiling pint, and then strain. This will keep for a long time.

Raspberry Syrup (3).—Six pints simple syrup, 2 pints water, 2 ounces tartaric acid, 2 ounces essence raspberry. Colouring sufficient. Colouring for raspberry, blackberry, etc., syrups may be made by boiling 1 ounce cochineal with half a teaspoonful cream of tartar; filter.

Raspberry Syrup (4).—Take any quantity of fully ripe fruit; free them from stalks; place them in a tub and crush them with a wooden spatula; after they have been mashed, let them remain for three or four hours, and strain the crushed berries through a strong flannel bag or strainer into a suitable vessel. Dissolve ½ ounce citric acid in 3 ounces water, and add this quantity to each gallon of juice; mix 14 pounds of broken sugar to every gallon of juice; put on a slow fire and stir until all the sugar is dissolved (not boil); take off the fire, and when cold, bottle and cork for future use. If too thick when cold, it may be brought to a proper consistency by the addition of water.

Raspberry Syrup—Imitation.—Three ounces bruised orris root. Two ounces acetic acid. One ounce acetic ether. One pint of alcohol. Cochineal to colour. Mix and allow to stand a few days; filter, and use to flavour simple syrup.

Rose Syrup.—One gallon simple syrup, 1 ounce essence

rose. Colour pink with prepared cochineal, and acidulate lightly with a solution of citric acid.

Sarsaparilla Syrup (1).—One gallon simple syrup. Two ounces essence sarsaparilla. Colour with caramel.

Sarsaparilla Syrup (2).—One gallon simple syrup. Essence sarsaparilla q. s. One ounce powdered extract licorice. Fifteen drops oil of sassafras. Fifteen drops oil of wintergreen. Ten drops oil of aniseed. Stir the oils with the powdered licorice; add a portion of the syrup; stir smoothly, and mix the whole together by agitation.

Sherbet Syrup.—Mix equal parts of orange, pineapple, and vanilla syrups.

Sherry Cobbler Syrup.—To 1 pint good sherry add an equal measure of heavy simple syrup, and one lemon cut in very thin slices. Allow the syrup to stand a few hours; strain through a sieve, and bottle for use.

Strawberry Syrup (2).—Proceed as for raspberry syrup (4); but the fruit being more stubborn will require a good beating with the spatula to mash them; when they have stood three or four hours strain and press the juice out by squeezing the strainer between the hands; add to the juice the same quantity of citric acid; dissolve in each gallon 14 pounds of loaf sugar; simply warm the juice sufficiently to dissolve the sugar; take from the fire, and when cold bottle and cork till required.

Vanilla Syrup (1).—One gallon simple syrup. One ounce extract vanilla. One-half ounce citric acid. Stir the acid with a portion of the syrup; add the extract of vanilla; mix.

Vanilla Syrup (2).—Four pints simple syrup. Two ounces extract of vanilla.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 50.)

TINCTURA SAPONIS VIRIDIS (*Tincture of Green Soap*).

Green soap	1
Alcohol	1
Spirit of lavender	1

Dissolve the soap in the alcohol, add the spirit, and filter.

LIQUOR PHOSPHORI ÆTHEREUS (*Ethereal Solution of Phosphorus*). [Solutio Phosphori Ætherea.]

Phosphorus, powdered (see before, p. 26)	1
Ether	200

Pour the ether in a flask provided with a well-fitting stopper; add the phosphorus, close well and macerate, occasionally shaking, for three or four days, or until no more undissolved phosphorus remains. Pour the clear liquid into small vials, which must be completely filled and kept in a cool and dark place.

SPIRITUS COCHLEARIÆ COMPOSITUS (*Compound Spirit of Cochlearia*).

[Cerevisia antiscorbutica Sydenhami—Sydenham's antiscorbutic Beer.]

Cochlearia, fresh flowering herb	72
Curled mint, dried and cut	6
Sage, dried and cut	6
Orange peel, dried and cut	8
Nutmeg, bruised	1
Alcohol (stronger)	36
Water	250

Macerate during one day and distil until the distillate has specific gravity of 0·960 to 0·980.

SPIRITUS MELISSÆ COMPOSITUS (*Compound Spirit of Melissa*).

Melissa, dried and cut	8
Lemon peel, fresh, cut	2
Nutmeg, bruised	2
Coriander, bruised	2
Cloves, bruised	1
Cinnamon, bruised	1
Alcohol	55
Water	70

Macerate during one day and distil off 72 parts. The specific gravity of the distillate should be 0·906.

SPIRITUS POLY-AROMATICUS (*Pharm. Belg.*) (*Polyaromatic Spirit*).

[Fioraventi's Balsam.]

Cloves, bruised	1
Nutmeg, bruised	1
Cinnamon bruised	1
Ginger, bruised	1
Myrrh, in coarse powder	2
Galbanum, in coarse powder	2
Storax	2
Laurel berries	3
Turpentine	4
Alcohol	98
Water	334

Macerate during one day and distil off 108 parts. The specific gravity of the distillate should be 0·900.

SPIRITUS TRAUMATICUS (*Pharm. Neerl. I.*) (*Wound Spirit*). [Aqua vulneraria.]

Sage	1
Melissa	1
Thyme	1
Marjoram	1
Rosemary	1
Lavender	1
Alcohol	20
Water	220

Macerate during one day and distil off 75 parts. The specific gravity of the distillate should be 0·975.

SPIRITUS VALERIANÆ COMPOSITUS (*Compound Spirit of Valerian*).

Valerian, bruised	9
Lovage seed, bruised	3
Pennyroyal, cut	2
Savin, cut	1
Alcohol	35
Water	35

Macerate during one day and distil off 30 parts.

SPIRITUS VULNERARIUS RICORDI (*Ricord's Wound-Spirit*).

Thyme, common (*Th. vulgaris*)	1
Origanum	1
Melissa	1
Peppermint	1
Marjoram	1
Rosemary	1
Sage	1
Wild thyme (*Th. Serpyllum*)	1
Hyssop	1
Wormwood	1
Rue	1
Tansy, in seed	1
Chamomile, Roman	1
Lavender	1
Alcohol	48

Macerate during one day and distil until the distillate has a specific gravity of 0·873.

SPONGIA CERATA (*Waxed Sponge*).

Dip soft, fine sponges, cleaned by beating and washing, and afterwards dried, into melted wax.

When they are thoroughly soaked, press them between warm plates.

SPONGIA PRÆPARATA (*Prepared Sponge*).

Wrap soft, fine sponges, cleaned by beating and washing, while still moist, with twine, so that the turns of the latter touch each other and the sponge be reduced to its smallest possible volume. Fasten the ends and let the compressed sponge dry.

SYRUPUS ÆTHERIS (*Syrup of Ether*).

Ether, stronger	1
Alcohol, stronger	1
Syrup	15

Mix the ether with the alcohol, then add the syrup, and mix by agitation.

(*To be continued.*)

* From *New Remedies*, April, 1882.

The Pharmaceutical Journal.

SATURDAY, JULY 22, 1882.

REPORT ON AN EXPLOSION IN A DRYSALTER'S WAREHOUSE.

In the early part of last year an explosion occurred on the premises of Mr. Riley, a drysalter and manufacturer of albumen, at Castleton, near Manchester, by which two persons lost their lives and another was seriously injured. According to the accounts given at the time in the newspapers and by Mr. Riley himself, it was represented that chlorate of potash had exploded in consequence of sparks—produced by an iron-hooped cask striking a wall—falling upon some of that salt scattered on the floor. This explanation of the accident was obviously improbable, since chlorate of potash is in itself perfectly harmless and free from any liability to explode even when exposed to considerable heat; but nevertheless the idea that the chlorate had exploded so far gained credence in the locality that after the accident some of the carriers hesitated to carry chlorate of potash on account of the supposed danger attending it.

The somewhat mysterious nature of this accident was considered to demand investigation, and consequently Captain Cundill, R.A., one of the inspectors of explosives, was instructed by the Home Office to inquire into the circumstances attending it. His report has recently been presented and some account of it will, we think, be interesting to our readers, besides being useful in affording an illustration of the way in which accidents may take place in such a warehouse as that of Mr. Riley. From Captain Cundill's examination of the premises, and of the stock contained in them, he came at once to the conclusion that the accident could not have occurred through the agency of any of the ordinary explosives, as the effects and visible remains of the explosion were totally different in character from those which gunpowder, gun cotton, nitroglycerine compounds, fulminates, etc., would infallibly show. Thus the idea that explosives, in the ordinary sense of the word, were illegally manufactured or stored by Mr. Riley, or introduced into his store by some one, with the design of injuring him, was entirely disposed of. Some of the results were partly consistent with the theory that an escape of gas, accidentally fired, had caused the explosion. But no importance could be attached to this view for several reasons. Search was made for picric acid or some of its salts among the stock, as they are articles used in dyeing and known to be dangerously explosive; but no trace of these materials could be found, and all the substances constituting the stock were found to be such as were in themselves perfectly harmless and free from explosive properties when pure and unmixed. However, two of these substances, viz., chlorate of potash and the yellow prussiate of potash, when mixed together, do form an explosive material of a somewhat energetic character, and they are constituents of what is known as white gunpowder. A very rough mixture of these two substances in approximately equal proportions, when ignited with a match, burns with considerable rapidity, much resembling ordinary firework composition, evolving a large amount of whitish smoke and leaving a considerable residue of a slaggy nature.

In the explosion at Castleton it was proved that there was no loud or sharp sound accompanying it, such as would be caused by gunpowder or ordinary explosives, but only a loud hissing like letting off steam, a low rumble and a noise like the "unloading of a cart of coals." There was a very large quantity of thick smoke evolved, described as grey or yellowish, and by one witness as very choking; but there was no violent local disruptive action, as evidenced by the absence of any shattering effects on the structure of the warehouse or on the persons within it, and by the fact that none of the packages of stock in the neighbourhood of the seat of the explosion were at all broken. These contained albumen, chlorate of potash, yellow prussiate of potash, and a little bone black; all separate and unmixed. On the walls, however, there were large quantities of slag or *débris* of the explosion and the floor was covered with a similar mass round the spot where the explosion took place. Some of this slag was submitted to analysis by Dr. Dupré, who found it to consist of yellow prussiate, chloride of potassium, chlorate of potash, carburet of iron and carbonate of potash. Hence, Captain Cundill infers that the cause of the accident was the ignition of a crude mixture of chlorate and yellow prussiate of potash, and he considers that this view furnishes a key to the otherwise puzzling statement of Mr. Riley that it was the chlorate of potash that exploded.

Two other questions then arise, how was the mixture made and how was it ignited? According to the evidence of Mr. Riley and his son, a spark was seen to fly from the cask hoop when it struck the wall, and there was some white powder on the floor, and on the day of the accident two kegs of "potash" had been brought into the store. An invoice for "one cask ground yellow prussiate and one cask pulv. chlorate potash" was also found among Mr. Riley's papers, bearing the date of the previous day. From the facts above mentioned, there can be little or no doubt that the explosive mixture was in considerable quantity on the floor, and not in any package, for the most careful search failed to disclose any fragments of a burst barrel or box. Moreover, the most severe burns on young Riley were on the lower part of his legs, as might be expected from the sudden outburst of a body of flame on the floor, and while the mass of slag was found on the very spot where the various brands of albumen were usually mixed in the ordi-

nary course of business, there were found standing close by two open kegs of the prussiate and chlorate, from both of which a considerable part of their contents had been taken. From these circumstances it is inferred that either Mr. RILEY was mixing the two salts experimentally, or in obedience to an order for the delivery of such a mixture, or that he mixed them purely by accident, thinking all the while he was dealing with chlorate of potash or with prussiate of potash alone. Both salts are largely used in dyeing, but there is abundant evidence to show that they are, as a rule, never mixed together in the dry state. Whatever may be conjectured as to the possibility of Mr. RILEY having been mixing the salts experimentally, it is very improbable that he was doing so as a regular part of his business, and Captain CUNDILL inclines to the opinion that the mixing was in some way quite accidental. It is *à priori* very unlikely that this was done by the wholesale chemists who supplied the ground salts, and in addition there is the fact that no exploded package was traced. As regards accidental mixture, it must be remembered that though the ground salts are sufficiently different in appearance to be easily distinguishable in a good light they might be mistaken in a dim light such as there would be in the warehouse where the explosion took place.

However the mixture came on the floor there is little doubt that it was there, and its ignition by the spark from the iron-hooped barrel which Mr. RILEY and his son were moving out of the way is readily intelligible. But since the mixture of chlorate and prussiate can be exploded by percussion and friction it is, moreover, not improbable that the mere rolling or perhaps dragging of the cask, or the movement of the feet over some portion of the mixture, exploded it so that the fire was communicated to the main body of the mixture.

This view of the case is in conformity with the verdict of the coroner's jury of "accidental death;" but Captain CUNDILL does not omit to point out in his report how the Explosives Act, 1875, would bear upon accidents resulting from explosion of a mixture of chlorate and prussiate. In cases where the mixture was made purposely for use as an explosive in the ordinary sense, it would come within the provisions of the third section of the Act, and the mixture would be classed under division 2 of class 4, so that if Mr. RILEY'S case had been of this kind he would have been guilty of illegal manufacture or storage of an explosive. If, however, the mixture were made purposely with a view to its use in dyeing or other manufacturing operations, this would not have been the case; but Captain CUNDILL thinks it would become a question whether provision should not be made, in the interests of public safety, for bringing the practice within the scope of the Act under the powers conferred by section 104, providing for the extension of the Act to any substance or process liable to dangerous explosion.

PHARMACY ACT PROSECUTION.

A CASE of prosecution for the illegal sale of a preparation of opium, reported at page 78, has been decided upon in a manner which a correspondent regards as "creditable," though we cannot quite agree with him. Of course we cannot vouch for the accuracy of the report in the local paper from which our extract is taken; but accepting that as it stands, there is, we think, equal grounds for satisfaction and regret. It would seem that we may congratulate ourselves on the fact that the police authorities who acted as prosecutors and the magistrates who heard the case were impressed with the idea that the trade in drugs and medicinal preparations should not be carried on by any persons but those qualified to do so by registration. That this is very sound as an abstract principle we readily admit; but unfortunately it is not quite in accordance with the law as it exists, and until that becomes the case it is desirable that prosecutions for infringement of the Pharmacy Act should be conducted in strict conformity with the provisions of that statute. There is the greater reason to regret any deviation from such a course since it happens that in regard to the majority of cases of infringement of that Act we must chiefly look to the application of the seventeenth section for a remedy and rely upon the properly directed action of the police and other local authorities for the stoppage of practices which are in every way objectionable. Surely in cases of this kind recourse might usefully be had to the local secretaries of the Pharmaceutical Society for instruction and advice as to the proper mode of instituting prosecutions.

RECIPROCITY IN PHARMACEUTICAL QUALIFICATION.

THE May number of the Australian Supplement of the *Chemist and Druggist*, published under the direction of the Pharmaceutical Society of Victoria, contains an article in reference to the reply of the Registrar of the British Society to the request that the Council should take into consideration the conditions under which the Victorian certificate of competency as a pharmaceutical chemist might become interchangeable with that of the British Society. Our readers will probably remember that this reply was to the effect that there are no statutory provisions in the Pharmacy Act of Great Britain empowering the Registrar to place any name on the register except in the ordinary way on production of certificates of skill and competency, signed by the respective boards of examiners appointed by the Council of the Society and approved by the Privy Council. It is admitted to be only right that the leaders and authorized guardians of pharmaceutical education in England should carefully guard their diplomas against deterioration, but at the same time some degree of disappointment appears to be felt that the proposal to establish an interchange of certificates was not entertained. On reflection, however, we trust that it will be seen how difficult would be the maintenance of a proper standard of competency if the suggested acceptance of certificates were to be acceded to, while there was no corresponding interchange of control over the education and examinations. Moreover, the recognition of certificates from one colony would be a ground for admitting it with others, and thus greater harm than good might be done.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Thursday, July 20, 1882, the report of the College of Preceptors on the examination held on July 4 was received.

Three hundred and seventy candidates had presented themselves for examination, of whom *one hundred and eighty-one* had failed. The following *one hundred and eighty-nine* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically.)

Airey, George Richard .....Birkdale.
Allan, Alexander .....Aberdeen.
Allen, John Sutcliffe .....Biggleswade.
Askew, John Robert .....Carnforth.
Baker, Joseph Aloysius .....Manchester.
Banyard, John Albert.....Anerley.
Barker, Frederick William.....London.
Bayes, William Thomas .....Leamington.
Beanland, John Milner .....Keighley.
Beck, John Wilson .....Morecambe.
Bennett, Albert .....Leeds.
Bishop, George Henry.....Southampton.
Bisset, James .....Burntisland.
Bolton, Richard Lee .....Leith.
Bond, Alfred.....Camborne.
Boon, James .....Pathhead.
Boor, Harry Herbert .....Spalding.
Bottom, Frederic Charles .....Sheffield.
Brown, Arthur .....Loughborough.
Cain, James Harold.....Douglas.
Capell, James Ralph .....Kettering.
Cawley, Francis .....London.
Cheesman, Henry.....Barton-on-Humber.
Chaston, William Robert .....Norwich.
Clark, George Alexander .....Portsoy.
Clarkson, Joseph .....Skipton-in-Craven.
Coates, Thomas Henry .....Chesterfield.
Coggin, Archibald H. G.....Ware.
Coldicott, Thomas Rowlands ...Stafford.
Cook, George Ellis .....Arbroath.
Cope, William James .....Longton.
Coull, William M. .....Arbroath.
Coutts, William Alexander.....Pathhead.
Cowan, Frank .....Rochester.
Cowpe, John William .....Manchester.
Cox, Frederick Hudson .....Southampton.
Crooks, Joseph .....New Shildon.
Cross, Thomas .....Sunderland.
Cumberbirch, William.....Wilmslow.
Cumming, John .....Portsoy.
Davies, John William .....Taunton.
Davison, James Richardson ...Alnwick.
Dawson, Thomas .....Currie.
Desborough, Newton D. .....Stamford.
Donaldson, James .....Irvine.
Dougall, William Braidwood ...Aberdeen.
Down, Elgar.....Barnstaple.
Dowswell, Charles W.....Tewkesbury.
Dyer, William Bury.....Halifax.
Ebbetts, Robert James .....Hanworth.
Enoch, Albert John.....Newmarket.
Evans, Daniel Ashton.....Llanbrynmair.
Evans, Robert .....Bala.
Eyles, John Robert .....Newbury.
Fieldsend, Arthur .....Penistone.
Fox, William Arthur .....Cleckheaton.
Franklin, Alfred James .....Brighton.
Fraser, James Leslie .....Inverness.
Frost, William Tite .....Northampton.
Gaddes, William .....Brampton.
George, William Arthur.....Pentre.
Gidden, Harry William .....Southampton.
Goddard, Henry Edward .....Great Yarmouth.
Godwin, William Charles .....London.
Golightly, John William.....Durham.
Goss, George .....Ipswich.
Gourlay, Henry Hamilton .....Lytham.
Grant, Alexander.....Blairgowrie.
Grant, Arthur T., Jun.....Helston.
Greenhalgh, William Henry ...Rotherham.
Hadden, Alexander .....Aberdeen.
Hampson, William .....Leigh.
Hanslow, Charles Edward .....Woodford.
Harradine, Holben M.....London.
Harris, William C. .....Perth.
Harsant, Alfred Henry .....Rochester.
Hartley, Joseph Henry .....Mirfield.
Harwood, Samuel.....South Shields.
Hatton, Henry John .....Warrington.
Hawkins, Lewis Walter .....London.
Haynes, Alexander .....Fleetwood.
Head, George .....Bridgnorth.
Hemming, Francis Harry .....Nottingham.
Herbert, Sydney Reeves.....Cockermouth.
Higgins, Charles Alfred .....Manchester.
Hindmarch, Thomas F. .....South Shields.
Honiatt, Albert Thomas.. .....Hereford.
Honman, Alfred Taylor ..... London.
Hughes, Thomas Edward .....Newtown.
Humphreys, Henry .....London.
Jackson, Urban Arthur .....Manchester.
Jackson, Thomas Booth .....Manchester.
James, Penry Foster .....Pentre.
Jarvis, James Henry .....Hastings.
Jenkins, John .....Pembroke.
Jenson, Alex. Benjamin .....Birmingham.
Johnson, Frederic.....London.
Johnson, Frederick Wm. .....Bath.
Johnson, Henry .....London.
Johnstone, William .....Lochmaben.
Jones, John .....Llandovery.
Jones, Thomas Walter .....St. Asaph.
Jones, William Thomas .....Carmarthen.
Kennerley, Francis Randle.....Congleton.
Kershaw, Sam .....Heckmondwike.
Knowles, Joseph William .....Thorne.
Lack, Edward Ernest .....Cromford.
Lamplough, James William.....London.
Langbourne, Walter Charles....Whitby.
Lewis, Gwilym.....Pontypridd.
Llewellyn, Thomas Richard.....Pontypridd.
Lowe, Osmond Henry .....Maidenhead.
Lucraft, William Henry.....Broad Clyst.
McKay, James Alexander .....Dufftown.
McKenzie, William Graham....Edinburgh.
McKie, Robert.....Blackburn.
Mallett, Henry Philip.....Norwich.
Martin, Mallard .....Staveley.
Matthews, Arthur Herbert.....St. Neots.
Merson, George .....Fraserburgh.
Miner, Major Thomas.....Walsall.
Moody, William Morton .....Salisbury.
Morley, Charles .....Beverley.
Morris, John.....Birkenhead.
Morris, Richard Clayton.....Welshpool.
Mumford, Sydney H. .....Cambridge.
Myers, Benjamin .....London.
Ness, Thomas .....Edinburgh.
Nicolle, Louis James .....Guernsey.
Oxen, David Hunter .....Tynemouth.
Palmer, Charles Lewis.....Grimsby.
Palmer, William .....Newport, I. W.

Parkinson, William .....Blackburn.
Payne, Joseph Hind .....Wainfleet.
Pelham, Sydney .....Basingstoke.
Penny, John.....Workington.
Pepperdine, Lemuel S. .....Lincoln.
Pettigrew, James.....Glasgow.
Phillips, John Cornelius .....Bath.
Pickering, Richard .....Blackburn.
Pickup, John.....Blackpool.
Pitt, Francis Henry.....Bristol.
Price, Walter .....London.
Procter, Robert Ashton .....Scarborough.
Puckrin, Thomas Edward .....Whitby.
Rae, Alexander David.....Aberdeen.
Rees, Colin Atkins .....Dartmouth.
Reid, Alexander .....Aberdeen.
Reid, David .....Bathgate.
Rennet, David .....Aberdeen.
Richards, David Edwin .....Crosswell.
Richards, John..... .....Llangadwaladr.
Richardson, George Lowas.....Appleby.
Robinson, Wm. Shakespeare ...Birmingham.
Sandbrook, John .....Market Drayton.
Saville, Charles .....Leeds.
Searle, William.....London.
Sinclair, Robert Hodge .....Dunfermline.
Skipworth, Bertram George ...Grantham.
Skirrow, Alfred Rhodes .....Skipton-in-Craven.
Smith, Charles B.....Potton.
Solomon, Walter Bernard .....Birmingham.
Sowden, George .....Spilsby.
Stanley, James.....Bulwell.
Stapleton, Frederick William...Shefford.
Steward, Charles .....Kirkcaldy.
Stewart, James.....Kirkintilloch.
Sutherland, Donald.....Aberdeen.
Swan, William..... .....Dundee.
Tait, Thomas .....Berwick.
Talintyre, Willliam John .....Stockton-on-Tees.
Taylor, George Harry .....Birmingham.
Taylor, Josiah Ellison.....Stalybridge.
Theckston, James.....Ulverston.
Thomas, William .....Swansea.
Thompson, Evelyn .....Ilkley.
Tompsett, Walter Hartness ...Maidstone.
Toyne, Charles Robert.....Hull.
Tredinnick, Richard Nettle ...Truro.
Watson, George .....Skipton.
Webb, Evan Howell .....Carshalton.
Wild, George Herbert.....Burnley.
Wilkins, Henry John .....Northampton.
Wilkinson, George Henry .....Coventry.
Wilkinson, Thomas Henry .....Keighley.
Williams, Arthur Llewellyn ...Pembroke Dock.
Williams, Richard Parry.....Carnarvon.
Wood, James.....Nottingham.
Wood, Joseph Arthur .....Oldham.

The questions for examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English:—

(i.) Mons autem altissimus impendebat, ut facile perpauci *prohibere* possent. (ii.) Helvetii legatos de deditione ad eum *miserunt*. (iii.) Petit atque *hortatur*, ut sine ejus offensione animi vel ipse de eo, causa cognita, statuat, vel civitatem statuere jubeat. (iv.) Nihilo secius Cæsar, ut ante constituerat, duas acies hostem propulsare, tertiam opus *perficere jussit*. (v.) De tertia vigilia, T. Labienum, legatum pro prætore, cum duabus legionibus et his ducibus, qui iter cognoverant, summum jugum montis ascendere jubet; quid sui consilii sit, *ostendit*. Ipse de quarta vigilia eodem itinere, quo hostes *irant*, ad eos contendit, equitatumque omnem ante se mittit.

2. Decline, in full, *opus, duabus legionibus, eodem itinere*.

3. Parse the verbs in italics, and give their principal parts.

4. Translate into Latin:—(i.) He will send an ambassador to Cæsar. (ii.) Three legions were conquered. (iii.) Let us fight bravely, that we be not destroyed. (iv.) They said they would never give up their arms. (v.) He was informed that many tribes had surrendered to the Roman people.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. Express, in words, the difference between the quotient of 9313702853 by 1987, and the product of 46481 and 936.

2. Reduce to a simple fraction $2\frac{1}{2} \times \dfrac{1}{3\frac{1}{3} + \dfrac{1}{4\frac{1}{4}}}$.

3. Reduce £16·73125 + ·3 of 7*s.* 6*d.* + 3·785 of 4*d.* to the decimal of £20.

4. Into how many farms, each containing 24 hectars 2 ares 9 centiars, can an estate of 1825 hectars 58 ares 84 centiars be divided?

5. If the rent of a farm of 53 acres 1 rood 6 poles be £100 17*s.* 6*d.*, what would be the rent of another farm containing 17 acres 3 roods 2 poles, if six acres of the latter be worth seven of the former?

III. ENGLISH.

1. Define a Conjunction. How does it differ from a Preposition and Relative Pronoun?

2. Illustrate, by examples, the adjectival and adverbial use of *wide, fast, right*.

3. Give words formed by means of the following suffixes:—*ly, ling, age, dom, ship*. Explain the force of each suffix.

4. Parse fully the following sentence:—

"He that fights and runs away,
May live to fight another day."

5. Write a short composition on *one* of the following subjects:—Self-reliance, The Telephone, "Whatever is, is right;" *or*, give an outline of some Play of Shakspere.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	17	11	6	Inverness	1	0	1
Birmingham	15	9	6	Lancaster	8	3	5
Brighton	6	2	4	Leeds	24	11	13
Bristol	9	4	5	Lincoln	7	3	4
Cambridge	3	3	0	Liverpool	10	6	4
Canterbury	2	0	2	London	54	25	29
Cardiff	10	4	6	Manchester	31	16	15
Carlisle	9	4	5	Newcastle-on-T.	9	6	3
Carmarthen	11	6	5	Northampton	4	3	1
Carnarvon	6	4	2	Norwich	8	5	3
Cheltenham	4	1	3	Nottingham	10	5	5
Darlington	5	2	3	Oxford	2	1	1
Douglas, I. of M.	2	1	1	Peterborough	5	4	1
Dundee	9	5	4	Sheffield	8	5	3
Edinburgh	22	12	10	Shrewsbury	7	3	4
Exeter	6	3	3	Southampton	9	6	3
Glasgow	10	3	7	Truro	3	3	0
Guernsey	3	1	2	Worcester	2	1	1
Hull	10	4	6	York	9	4	5

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting was held in the Society's Rooms on Wednesday evening, July 12, Mr. Preston, President, in the chair.

The minutes of the previous meeting having been read and passed, and other business transacted—

Mr. Preston moved that as there was such a small attendance the meeting be adjourned until the second Wednesday in October, and that Mr. Furness be requested to read his paper, of which notice had been given, on that date.

Mr. Furness having agreed to do so, the motion was seconded by Mr. Ellinor and carried unanimously.

Mr. J. Preston, President, and Mr. G. T. W. Newsholme, Honorary Secretary, were appointed delegates to attend the forthcoming Pharmaceutical Conference at Southampton.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

The Chemical Technology of the Jute Fibre.*

BY CHARLES F. CROSS.

The introduction of the jute fibre into this country dates back only some twenty-five years, and during the quarter of a century of its application by Europeans it has occupied an increasingly important position in textile manufactures; and having emerged from the sphere of application, viz., that of textile drudgery, to which it was at first limited, and evinced capabilities of a high order, for the more elegant uses of woven fabrics, it is full time that it should be made the subject of accurate technical study. It was my privilege to be entrusted with an investigation of this fibre, and the results of four years' scientific work, together with the practical experience of their application, are my credentials for engaging the attention of the Society upon this important question.

The first applications of jute in Europe were, as I have said, confined to the production of the coarsest materials, such as sacking. In India, on the other hand, this fibre has been from the earliest antiquity manufactured into fabrics second only to cottons in point of fineness; and its relative importance to cotton in India is that of flax and hemp in Europe. In accounting for this fact, we have to take into consideration the conditions under which it is produced in India. Jute, as is well known, is the bast of certain species of *Corchorus*—a family of tiliaceous annuals, isolated from the matured plants (which, during their five months' growth, attain a height of 10 to 12 feet) by a process of retting. The cultivation of the plant, which has hitherto been practically confined to India, chiefly Bengal, is for the most part in the hands of the native tenant-farmers, or ryots. Now, in all bast fibres, which tend to what is known as lignification, the changes by which this is brought about set in at a definite period of growth; in the case of jute they appear to commence at a comparatively early stage of development, but are most pronounced at the period of flowering. In its practical aspect the lignification of jute is the change from the state of elastic thin-walled tubes, which is the structure of the ultimate fibrils, to that of thick-walled cylinders of much diminished pliability, the gain in substance, that is to say, being brought about at the expense of the textile quality of the fibre. The ryots know this but too well. For their own use they harvest the plants early, before the flowering season, and consequently are able to spin and weave the isolated bast into the finest fabrics; for the European market, on the other hand, they allow maturation to proceed much further, and hence the inferior quality of our commercial jute. Whether it would be expedient to secure a supply of the fibre in its finer condition, and to take steps to overcome the difficulties of organizing the native growers to such a production, is a question that should not be left unanswered; but at this opportunity we have rather to confine ourselves to jute as we find it in European commerce. The finer applications which it has received have been the outcome of periods of scarcity of the fibres with which it has had to compete. The Crimean war shortened our supply of hemp, and the American war that of cotton, and in both cases jute was called into requisition as a substitute. The applications of the fibre, however, to which our attention is about to be directed, are those which rather involve its *chemical* technology, and the more recent developments to which its study has led.

The raw fibre, as we obtain it, is composed of the upper five-sixths of the isolated bast, the root end or lower sixth being cut off, generally before shipment, and constituting the commercial article known as jute "cuttings" or "butt," which are a valuable material to the paper-maker. The former occurs in lengths of about 7ft. Its colour varies from brown to silver-grey, the average shade of yarns spun from the higher qualities being yellowish-grey. A certain depreciation in colour occurs in the process of spinning, partly resulting from the admixture of oils (generally a mixture of whale oil and petroleum), added for the purpose of loosening certain resinous constituents by which the fibres are matted together, and partly to oxidation and adventitious dirt. The jute fibre substance has the following properties: The finest fibres into which it is resolved by ordinary mechanical means consist of bundles of microscopic fibrils, each of which is a cylinder with irregularly thickened walls, the thickening often amounting to partial interruption of the central lumen. These bundles offer a smooth cylindrical surface, and to this fact we may refer the high lustre of the fibre, which, I may add, is much increased by bleaching, probably also by reason of increased smoothness resulting from the removal of substances more or less adventitous. Its chemical composition—and on this point I must be very brief—has been the subject of research by myself, in conjunction with Mr. Bevan, and our results, which have been fully published in the *Journal of the Chemical Society*, may be summed up as follows: The fibre cannot be proved to contain cellulose as such, but is made up of a derivative or derivatives of cellulose, to which we have given the general term of bastose, the disposition of these (*i.e.*, if there be several), being such as to give a homogeneous whole, which may, therefore, at least for practical purposes, be considered as a single substance. Cellulose being a member of the carbohydrate series of compounds, bastose represents a transition to what is known as the aromatic group. By the action of chlorine—and the practical importance of this will be at once evident—bastose is converted into a *chlorinated compound*, which has two very striking properties. By the action of sodium sulphite it is converted into a brilliant colouring matter of a magenta shade; and by the action of alkalies it is resolved into insoluble cellulose on the one hand and soluble bodies allied to the astringents or tannins on the other. A somewhat crude illustration may be used here with advantage to convey a clearer practical conception of these points. Cellulose in all its forms has the power of taking up tannin from its aqueous solutions to form insoluble compounds. Upon this property the ordinary process of mordanting cotton is based. When such a compound is treated with chlorine a chlorinated compound is formed in the fibre, which will give the reaction with sodium sulphite before alluded to. Further, such a compound has the power of taking up the aniline and

* Read at a meeting of the London Section of the Society, March 13.—From the *Journal*, April, 1882.

other soluble colours from their solutions, and thus of becoming dyed with fast shades. This property is possessed by the jute substance itself. By the dyer, therefore, jute may be regarded as a cellulose fibre, a portion of which has become intrinsically modified—in and by its growth in the plant—into a tannin-like substance; and this modification, moreover, having taken place homogeneously, it may be regarded as evenly mordanted. This fact is one of great technical importance; for the process of spinning jute is relatively crude, the fibre being only very imperfectly averaged, so that but for this property of dyeing evenly throughout its substance, jute would be an additional trial to the already much tried dyer. There are two other resolutions of the jute substance which must be alluded to as of great practical importance. (1) When large masses of jute are allowed to lie in the damp state, especially in contact with sea water, the fibre substance is split up into two bodies, or groups of bodies, viz.: (*a*) tannin-like substances, and (*b*) acids of the pectic class, this resolution of the fibre being attended by greater or less disintegration, often amounting to its reduction to a friable powder. Not to dwell upon the more purely scientific bearings of this decomposition, which will be found fully discussed elsewhere, its practical importance will be at once recognized; for the susceptibility of a fibre to this radical change suggests its far more general occurrence than would be indicated by extreme manifestations, and hence the possibility that our whole jute supply is more or less deteriorated by the conditions of its preparation and transit to this country. In support of this we have the testimony of practical men as to the superiority in colour and strength of the goods manufactured in the jute mills in India, although the raw material is drawn from the same source which supplies the European markets. I have made experiments in which jute, specially treated with the object of maintaining its chemical integrity, has been exposed for eight months to damp, in darkness—the conditions which it has to encounter in the hold of a ship—and the results were quite satisfactory. It seems to me, therefore, a matter of essential importance that the native industry should be inquired into by a competent individual or commission, with the view to improve as far as possible our raw material by removing the defects of the present system of production and shipment; and further that such a subject were well worthy the practical consideration of the Society of Chemical Industry. (2) Another decomposition of the jute fibre substance, which has special bearings upon its treatment in dyeing and bleaching, is that which is caused by acids, and notably the mineral acids. Again we must pass over theoretical matter, and limit ourselves to a practical sketch. The jute substance is, then, very easily degraded into soluble modifications, under the influence of acids at comparatively low temperatures; and these soluble modifications are resolved at somewhat higher temperatures into bodies of a dark-brown colour, allied to the so-called humus group, on the one hand, and volatile strongly-smelling bodies, furfurol and its allies, on the other. Hence the "tenderness," strong smell, and tendency to discoloration of jute goods in the preparation of which acids have been used without a scientific or empirical recognition of this their destructive tendency. For instance, I know of a case where a manufacturer introduced a cheap serge blue (aniline) for the dyeing of his sack stripes. The dyer found that, to dye a blue shade with this colour, in order to eliminate the red, he had to employ a large quantity of sulphuric acid. Being limited by the necessity of a fixed output, he did not alter his subsequent washing process to meet the new requirements of the case, and the result was that some tons of yarn were totally destroyed, the destruction becoming apparent only when the yarn was wound. It is only necessary to add that the use in his wash-water of 1 pound of sodium acetate to every 56 pounds of yarn was introduced with the result of allowing the colouring matter in question to be used, with no further change of process. This use of sodium acetate to antagonize the influence of acids, which is so commonly practised by calico printers, is especially to be recommended to the jute dyer, as it will be found to prevent the changes alluded to above.

We come now to the most important part of the subject of the treatment of jute which can engage our attention as chemical technologists. As a preliminary to our discussion of the processes by which jute is fitted to discharge its now more elegant offices, I must mention one or two points in connection with the action of bleaching agents upon jute. The raw fibre can be bleached with the greatest ease by means of permanganates, with subsequent removal, by treatment with sulphurous acid, of the manganic oxide deposited in the fibre, and expressing the oxidation which it has undergone. In this process the loss of weight experienced by the fibre is a minimum, generally amounting to from 2 to 3 per cent. Jute yarn is bleached somewhat less readily by these reagents, and the bleaching must be preceded by alkaline treatment for the removal of adventitious matters. The process, although leaving nothing to be desired in point of simplicity and result, is too costly for adoption on the large scale, it being necessary to employ from 2 pounds to 3 pounds of the potassium salt per 56 pounds of yarn, which alone brings the cost over 1*d.* per pound.

For commercial purposes the only agents available are the hypochlorites. Reference to what has been previously stated as to the action of chlorine upon jute will make it evident that its employment in any form upon the fibre must be watched with the greatest care. Any one ignorant of its distinction in chemical composition from the true cellulose fibres would probably treat it with bleaching powder in the usual way, and in such a way as to cause actual combination with chlorine. I myself have seen this more than once, especially in the case of jute cloth, the presence of the chlorine compound being demonstrated by the development of a magenta stain, more or less deep, when the cloth is treated with a solution of sodium sulphite. It is easy to predict the fate of such a cloth in the steam-chest of the printer—the liberation of hydrochloric acid by the decomposition of the compound in question, the development of dark brown-coloured products of decomposition, accompanied by the total disintegration of the fabric. This, too, has occurred on the large scale—often in such a way that the mischief was not detected till the fabrics came to be used; and the result has been to confirm popular prejudice against jute. Another point remains to be noticed, viz., that the jute substance is oxidized by hypochlorite solutions to form compounds which precipitate the soluble calcium salts, and when ordinary bleaching powder is used, therefore, in the bleaching of jute goods, insoluble calcium compounds of these derivatives are often formed in the fabrics. It is easy to see, therefore, how the bleaching of jute by the ordinary empirical method has yielded an inferior product, harsh to the touch, brittle, and strongly smelling; and it should not be more difficult to suggest the rational method of overcoming its defects.

The following brief sketch of a process founded upon the results of the investigation of the chemical composition and properties of the fibre substance will bring into prominence the chief points which have to be observed in the bleaching of jute, so as to conserve its integrity. The process is specially adapted to cloth. Essential details only are given: (1) The goods are scoured in a weak alkaline solution (sodium silicate, or carbonate, or borax, at 70° to 80° C.) (2) From the scouring solution they are transferred to the bleaching liquor—a solution of sodium hypochlorite prepared in the usual way by decomposing bleaching powder with the equivalent quantity of sodium carbonate. The chlorine strength of this solution should not exceed 1 per cent., and the

most convenient working strength I have found to be 0·7 per cent., which therefore will require for its preparation a quantity of bleaching powder equal to about 2 per cent. of the weight of the water used for solution. The presence of the soda entirely prevents the formation of chlorinated compounds of the fibre substance. The mechanical details of the bleaching must be left to the judgment of the operator. (3) The goods, after thorough washing, are transferred to cold dilute hydrochloric acid (1 to 2 per cent.), containing a small quantity of sulphurous acid. The object of this treatment is to remove basic substances, the presence of which causes discoloration of the fibre when brought into oxidizing conditions—notably in the printer's steam-chest—and also to eliminate iron compounds, which previously to this treatment would be found to be evenly distributed in small quantity throughout the cloth, and if left would interfere with any subsequent dyeing operations. The cloth thus treated is of a pale cream colour, and is beautifully soft and lustrous. If the cloth is required to be dyed, it may be taken, of course after thorough washing, to the dye beck. If, on the other hand, for printing, it is subjected to an additional process (4), which consists in running it through a solution of sodium bisulphide of 1 to 2 per cent. SO_2 strength, the excess of the solution being removed by mangling, and returned to the bath. The mechanical arrangements of this treatment should be continuous and automatic. The cloth thus treated is allowed to lie some time (two to three hours), and then dried on steam cylinders. During this process sulphurous acid escapes, and the dry cloth will be found evenly impregnated with neutral sodium sulphite. The presence of this salt antagonizes the oxidizing and disintegrating action of the steaming by which the colour mixtures printed on the fabric require to be developed, without, however, interfering with this latter process. This treatment, moreover, causes a marked improvement in the colour of the bleached cloth, and restores the fibre substance to the normal state in which it is not susceptible to change under ordinary atmospheric conditions. The process has been patented and worked with uniform success. It only remains to be stated that the loss of weight experienced by the fabric need not exceed 7 to 8 per cent., with a diminution of tensile strength of about 10 per cent. of the original; these numbers representing the average of long experience; and the entire cost of bleaching, of course under properly regulated conditions, should not and does not exceed 1*d.* per pound.

In conclusion, I would say a few words on the subject of the position of jute in the textile market and the popular prejudices which have to be overcome before it attains the position which belongs to it by right.

The value of the fibre in its stable applications is, of course, sufficiently recognized. What we have to consider are its relations in the more elegant uses of textile fabrics. Woven mixtures, especially of cotton and jute, in which the latter is employed as weft, have of late won for themselves an extensive demand; and the lustrous and woolly character of the jute yarns, together with the bright fast colours which are so easily communicated to them, insure their permanent application to this purpose. Nevertheless, it will be found that the retailers observe a diplomatic reticence, in deference to the prejudices in question, as to the true nature of these goods; and it is the gratuitous character of this which I wish to expose. It has been commonly supposed that inferior silks are inferior by virtue of adulteration with jute; on the other hand, I have never been able to verify this supposition. It is true that in silk dye-houses in this country spun yarns and inferior silks are commonly termed by the men "jute," and this may account for its having become a general byeword in textile industry; but I have been quite unable to account for its origin in this connection, and I have certainly never met a silk dyer who was at all acquainted with the actual jute. Further, the inferiority of silks is so completely accounted for by the well-known practice of "weighting"—the scientific character of which appears to be so complete an answer to the question of its morality—that, in the absence of positive proof, jute may be left out of the question altogether. It is, however, a fact that printed goods, consisting of jute, both of home and foreign production, have been put upon the market in a form attractive enough to the eye, but so greatly "tendered" by the processes to which they have been subjected, and moreover so unpleasantly odorous, as to have earned a very emphatic and proper condemnation; and it is this fact which has done so much to confirm the existing prejudices against jute.

We are now, however, in a position to see that such a result must follow from the ignorant application of processes to this fibre, which had been erected by long experience into the position of the standard method of treating vegetable fibres; that, on the other hand, the distinctive character of the jute fibre substance postulates a very distinctive treatment, such, for instance, as I have endeavoured to set forth in this paper. It is with the view of securing the general recognition of this by practical men, and thus to aid in establishing the jute fibre in its rightful place in textile industry, that I have ventured to direct the attention of the Society to the chemistry of this interesting fibre.

In answer to questions propounded by those who took part in the discussion which followed the paper, Mr. Cross supplied the following additional information:

The chemistry of the fibre and its technological applications were independent of the changes alluded to as occurring during its shipment and transit, *i.e.*, they truly belonged to the normal fibre. In regard to these changes, their *immediate* cause had not yet been ascertained, but they were essentially due to the peculiar chemical constitution of the fibre substance. The brilliant colour reaction described was obtained, though less effectively, by treatment with sulphite after oxidation by chromic acid, as well as after chlorination.

The fibre could be perfectly bleached by confining it over phosphorus in a moist atmosphere, and also by hydrogen peroxide, but these actions are difficult to control. The normal fibre was totally disintegrated and largely converted into soluble products of decomposition of the fibre substance by both water and steam at high temperatures (120° to 130° C.)—even when heated with sodium acetate solution, in an ordinary retort, acetic acid distils—showing that it is decomposed under these conditions, and with formation of acids. The presence of sodium sulphite, in small quantity, has been found to prevent this decomposition, the explanation of its action being probably its well-known relationship to aldehydes, certain of which tend to be formed from jute when under oxidizing conditions.

Jute appears to be the first case of the employment, on the large scale, of a fibre of what may be termed a *non-cellulose* character, in such a way as to involve chemical manipulation; hence the negative experience which resulted from an uninquiring application of methods suitable only for cellulose fibres. Jute is by no means singular in chemical composition; indeed its characteristic constituent seems to be almost as widely diffused throughout the plant world as cellulose itself. Other similar bast fibres may be expected to find their way into the textile industries, and these also will require special investigation and treatment.

Parliamentary and Law Proceedings.

Alleged Poisonous Effects of a Domestic Remedy.

An inquest was held on Saturday, July 15, before Mr. Wightman, coroner, at Sheffield, on the body of Annis Bell, aged nine month.

Elizabeth Bell, the mother of the child, was called,

and stated that when seven weeks old the child was ill, and was attended by Dr. Gill for a fortnight. He said she was suffering from bronchitis and inflammation on the brain; since then the child had gradually pined away. On Monday night witness gave her a teaspoonful of a mixture of "oil of almonds and violets," and again on Tuesday morning and at night—three spoonfuls altogether. She purchased a pennyworth of the mixture at the shop of Mr. Stanfield. It seemed to give the child relief, and that was why she repeated the dose. As the child was worse on Wednesday morning, and continued to "screech and whine," she sent for Dr. Gill, and he said he could not account for the condition of the child, and asked what had been given to it. She told him about the mixture, and he replied that it was poison, and she had no right to have given it to the child. He did not believe in such mixtures. The child died on Thursday, and Dr. Gill refused to give a certificate because of the poison that had been given to it. The child was not in a club, and the parents would get no money by its death.

A Juryman asked if the bottle was labelled "poison."

The Coroner said it was not, and his experience of oil of almonds was that there was no need to so label the bottle. The Coroner added that they had now got as far as they could without a *post-mortem* examination, and he put it to the jury whether he should order one or whether they were satisfied with the evidence that had been given. The reason for holding the inquiry was because Dr. Gill had refused to give a certificate, the child having had oil of almonds given to it. His (the coroner's) opinion was that it was an innocent, harmless mixture, and if the mother had given the child the whole of the pennyworth it would not have killed it.

The jury thought there was no necessity for a *post-mortem*, and they expressed themselves very strongly about the doctor, and wished to censure him for refusing the certificate.

The Coroner said he should not like them to do that, as it was a serious thing to censure a doctor.

The jury, however, had their say about it, and then came to a verdict of "Death from natural causes, probably convulsions."—*Sheffield and Rotherham Independent.*

The Sale of Paregoric.

At the Denbigh Borough Magistrates' Court, on Friday, July 6, Elizabeth Roberts, Henllan, was charged by Superintendent Vaughan with having on May 27 sold a quantity of paregoric elixir, being a preparation of opium, without being duly licensed as a dealer in drugs.

Defendant pleaded ignorance of the requirements of the law.

Superintendent Vaughan called a boy whom he sent purposely to the defendant's shop to purchase drugs. The lad stated that Mrs. Roberts had told him to be careful with the elixir, as it was a strong poison. The bottle in which he brought the drug away was not labelled.

Defendant said her late husband was registered to sell drugs.

Superintendent Vaughan had entirely failed to find his name on the register for the last nine years; but he was positive that defendant was not registered.

The Bench explained that the late Mr. Roberts being duly registered his widow would under some circumstances be allowed to sell drugs for some time after his death.

Captain Lloyd Williams (the Mayor not sitting in the case), said the bench considered the case proved, and would deal as leniently as possible with her. She had pleaded ignorance, but ignorance where drugs were concerned was a serious thing. She would be fined 10*s.* and the costs—£1 18*s.* in all.—*Carnarvon and Denbigh Herald.*

Poisoning by Sulphuric Acid.

The Manchester City Coroner held an inquest on Monday, on the body of Clarissa Tomlinson, a widow, 80 years of age. On Sunday night the deceased felt unwell, and expressed a desire to have a glass of port wine. Her son went upstairs for the bottle, and in his absence the old woman took from a cupboard a bottle which she fancied contained wine, and drank a portion of its contents. She was immediately seized with symptoms of poisoning, and an emetic was given her, but she died in a short time. The surgeon who was called in found that the bottle contained sulphuric acid. A verdict of accidental death was returned.—*Manchester Guardian.*

Review.

The Tea Industry in India. A Review of Finance and Labour, and a Guide for Capitalists and Assistants. By Samuel Baildon, author of 'Tea in Assam.' W. H. Allen and Co, Waterloo Place, S.W. 1882.

The author has written a very readable account of the Tea Industry in India, entering largely into the financial aspect of production and disposal, the labour question, and planter's life; and at the same time giving useful information both to speculators and intending cultivators. This latter portion of the subject is evidently the work of one intimately acquainted with practical matters and social details, and no one should venture upon this special industry in the hope of making it remunerative until he has carefully studied Mr. Baildon s observations.

Some idea may be formed of the importance of this branch of commerce by reading the very recent statement by Mr. J. R. Royle, who has an hereditary claim to be accepted as an authority. "It is only forty-four years ago, viz., in 1838, that the first consignment of Indian tea, consisting of the trifling amount of 456 lbs., reached the London market. This consignment sold remarkably well, realizing fancy prices, and thus gave great encouragement to the spread of tea cultivation in India. Since that time, the amount exported from India has gone on almost constantly increasing, until the exports for the official year 1880–81 are returned as amounting to 46,000,000 pounds, having a value of more than £3,000,000 sterling." The time is passed, however, for people to stand beneath the Silver tree in the moonlight, and whistle for the rupees to come down. The princely fortunes of a century ago have become rare things, and money in India, as elsewhere, must be made by steady work and a sufficiency of capital for the start. More particularly is the young adventurer warned not to leave a comfortable home "on spec.," or he will find himself among a crowd of unfortunates who have committed the same error, and generally with disastrous consequences.

The Indian introduction of the tea plant is veiled in fabulous history. Primarily there was but one kind of plant, and it is still almost an open question as to what is the difference between *Thea viridis* and *Thea bohea.*

In India, making either green or black tea depends upon the will of the planter.

All writers on Indian tea allow that there are three classes of the plant, the indigenous, the China, and the hybrid. The China is supposed to be a deteriorated specimen of the pure Indian plant, though centuries of varied cultivation, and even of neglect, have converted it into a distinct variety. Continuous changes have, moreover, assisted in the production of an entirely new plant, the hybrid. Indian tea is now almost entirely of the hybrid class of various degrees, and what little

remains of the originally propagated China tea is a scrubby bush.

A good tea climate must be humid, and according to the author Indian tea was in perfection when it luxuriated in the dampness of the jungle, before a more extensive demand dragged it from its retreat and caused it to be grown in localities which were drier because more accessible to light and heat. Mr. Baildon throughout reiterates a statement which will not be palatable to many of his readers, that while Indian tea is intrinsically superior to Chinese, it is too strong to form an unmixed beverage. With certain exceptions, Mr. Baildon contends that this unwelcome opinion must be accepted.

The planters themselves, the author says, do not drink it, and it can never in an unmixed state become an article of general consumption.

Mr. Royle, discussing the same subject, considers the rage for cheap teas, the method of packing and weighing the Indian varieties, and the customs duty, as the hindrances which affect its introduction; and he points hopefully to the opening of new markets in Australia, America and Canada.

Mr. Baildon bases his expectations rather on the score that Indian tea is admirable for the purpose of blending with other, and weaker varieties; and that it is now used universally to fortify Chinese tea. He argues that from the nature of its cultivation, the whole production being under European supervision, and from its comparative scarceness, its prices must rule higher; but should it ever come into general use, that is be consumed in an unmixed condition, the low price at which then it must be offered would not prove remunerative to the planter.

This Indian tea enjoys a wonderful immunity from adulteration, and in that respect is superior to the Chinese, which is tampered with to a sensational extent.

"At a recent exhibition in Sydney, the Chinese teas subjected to a Government analysis were pronounced in many instances to be adulterated with injurious, and in some cases even poisonous matter; while in the Indian exhibits, placed under the same test, not one case of adulteration was recorded" (p. 30). Mr. Baildon may be expected to be enthusiastic about the merits of the special tea which he has set himself to describe; he considers the Indian superior to the Chinese as a growing plant; that as a manufactured article it is infinitely purer, no artificial doctoring having been required to make it presentable; and that a large proportion of the present China imports would be unsaleable without its aid.

Much light is thrown by the writer upon the private working of the tea industry; nothing more promotes success than a good understanding between the planter and the executive of an estate.

Land is not always equally productive; even in India the seasons vary; and hail-storms, blight and cholera are disturbing elements. Mutual forbearance becomes not only a virtue but a necessity; owners must not be too exacting, and planters must make allowance for irritation on account of deficient crops. At all events, owners, agents and speculative companies are advised not to make sudden alterations in their staff, but to adopt President Lincoln's motto, "Do not change horses while crossing the stream."

The chief difficulty for the planter, specially for the inexperienced young Englishman, is not so much want of knowledge of the theoretical cultivation of tea, as want of understanding the management of coolies.

Mortifying as this may seem, book information will avail but little in comparison with skill in directing labour.

Coolies are fond of change, and with great difficulty can be persuaded to remain beyond their stipulated time. They are a willing prey to intriguing speculators on the look out for old hands; and moreover, they are known occasionally to bolt. By no means the least interesting portions of the book are devoted to these causes of perplexity, and they should be well considered before any decided step is taken to exchange orderly English business habits for the supposed higher attractions of life in India.

The author ends his treatise with an elaborate statement as to the better condition of the plantation cooly (*sic*), compared with that of the ryot, or labourer who pays rent to the Government in Bengal and other localities.

"There is absolutely no parallel in the tea districts to that which is officially reported to be the state of affairs in many parts of India" (p. 209). Again. "There are no famine times in tea. The cooly has only to do his work, to receive his pay, grow fat and save money." He has no rent to raise—his house is kept in good repair; and when ill, he has the services of the doctor. The ryot, on the other hand, is ground down by perpetual exactions, legal and otherwise; and as a culminating point of misery, the rent being demanded *before* his crops have ripened, he is held in bondage by the money-lender. It would add greatly to the prosperity of the country, and benefit the planter, if coolies were recruited from the overpopulated districts of Bengal.

It is further proposed by the author that analytical chemists should be appointed to examine and report upon the soils best adapted to the tea industry; and that gardens which are at present unremunerative should be abandoned.

Mr. Baildon has issued a genuine book, which contains much valuable information; while the social aspects of the question are most graphically described.

BOOKS, PAMPHLETS, ETC., RECEIVED.

THE MEDICAL DIGEST, OR BUSY PRACTITIONER'S VADE-MECUM. By RICHARD NEALE, M.D. Second Edition. London: Ledger, Smith and Co. 1882.

THE MEDICAL MAN'S HANDY BOOK. Edited by WILLIAM SHEPPERSON. London: J. and A. Churchill. 1882.

THE STUDENT'S GUIDE TO MATERIA MEDICA AND THERAPEUTICS, in accordance with the British Pharmacopœia. By JOHN C. THOROWGOOD, M.D., etc. Second Edition. London: J. and A. Churchill. 1882.

Notes and Queries.

[729]. TINCT. QUINIÆ AMMONIATA.—As "A Country Chemist" confesses that when he prepares this tincture strictly according to the instructions of the Pharmacopœia, he does not fail to obtain a clear and presentable solution, I must admit my inability to grasp his meaning when he states that there are still some points which have not been cleared up by my communication, published in this column some weeks ago, supplemented as it was in a later issue by some practical remarks from Mr. Smith, of Leamington. Of course, if, as he states, he has made use of "hard water," the reason of the precipitation becomes at once very evident, and, as the Editor very properly suggests, is not due to the presence of quinine at all. Your correspondent is no doubt aware that ordinary "hardened" water contains, amongst other substances, a notable proportion of calcic carbonate, which is held in solution by an excess of carbonic anhydride present in the water. On the addition of the solution of ammonia to this water the dissolved gas is neutralized by the alkali and a minute quantity of soluble ammonic carbonate formed. There being now present no body capable of exerting solvent action on the salt, the calcic carbonate goes out of solution and has, no doubt, been mistaken for precipitated quinine.

J. E. SAUL.

[732]. SPONGES.—What is the method generally used for restoring "flabby" sponges? A. E. R.

Correspondence.

The Future of Pharmacy.

Sir,—You have published a letter from Mr. Hart, of Manchester, reflecting strongly upon the good faith of the Stockport chemists.

He states that by far the larger number of chemists in Stockport do a large trade in supplying not only grocers, etc., but little hucksters' shops, with drugs, pharmaceutical preparations, etc., and upon this statement he draws a series of libellous conclusions.

Now of the twenty-two chemists on the Register in Stockport, there are not more than three who do a wholesale trade; these three are not only chemists and druggists but drysalters and oil and colourmen, one of whom sends out no traveller; another sends one half a day per week, who calls only upon surgeons and manufacturers, not on shopkeepers, whilst the third very properly keeps together a connection which has been established amongst surgeons, manufacturers and shopkeepers for more than a century.

Mr. Hart having thus far drawn on his imagination for facts, not hesitating at a deliberate untruth, next invents an imaginary conversation, or distorts one for the purposes of satire.

Sir, you have in this published an unfounded and unwarranted attack upon a body of your members, who value their independence and respectability as highly or more so than Mr. Hart evidently does, and the chemists of Stockport request me to ask you to publish this letter, and to obtain for them the amends they feel themselves entitled to. Our Association has met this morning and taken into consideration the said letter, and has instructed me to take such steps in reference thereto as may be deemed advisable.

Stockport Chemists' Association, Stockport. Wm. Billing Orton, *Secretary.*

Sir,—Will you kindly find room for the accompanying correspondence in your next issue?

J. Hart.

Copy.

"Stockport Chemists' Association,
"Stockport, *July* 15, 1882.

"Dear Sir,—Having read your letter to the *Pharmaceutical Journal* of to-day, will you kindly give me the name of the one who 'employs a traveller to cultivate this particular trade,' and the name of the one 'who indignantly replied, "I am not," etc.' By so doing you will much oblige

"Yours truly,
"Wm. Billing Orton,
"*Secretary.*

"J. Hart, Esq."

Copy of Reply.

"131, Embden Street, Manchester,
"17*th July*, 1882.

"Dear Sir,—I trust you will not think me wanting in courtesy if I decline to give you the information you require; in fact, the reasons why I should not do so are so very obvious that I can scarcely credit you were serious in making your request; besides which my letter was a public one on a public matter, not attacking individual persons, but pointing out and striking at the greatest curse of our trade, that, whilst we so loudly deplore our lot we never strive to better it by our own individual effort. I do not suppose, nay, I am quite sure the Stockport chemists are not sinners above their brethren, but the fact of their presenting the memorial was the reason of my using them 'to point a moral and adorn a tale.' My strictures will, I am sorry to say, apply to a large number of towns, and if you have any remarks to make upon them, I shall be most happy to discuss them in the columns of the Journal (to which I send this correspondence), with this sole proviso that the 'Future of Pharmacy' and not individuality is to be the text.

"I am, dear Sir,
"Yours faithfully,
"J. Hart.

"W. Billing Orton, Esq."

Fresh Bael Fruit (Ægle Marmelos).

Sir,—Seeing a letter in last week's Journal under the above heading, I was induced to read it through; but up to the present moment I have not been able to decide what Mr. Postans's intention could have been when he penned that letter. It occurs very forcibly to me that his chief objects must have been to remind the pharmaceutical world that some three years since he presented the Society with a specimen, and that he also drew attention to it (the specimen, of course, not the act of presentation, or was it a little bit of both?) at an Evening Meeting.

But be that as it may, Mr. Postans may rest assured that we all know where or how we may obtain the "best preparation" of the fruit when we have occasion to use it. We have had a preparation of it in our Pharmacopœias for a number of years equal, if not even greater, than the number that Mr. Postans has spent in the business. The preparation has, therefore, had ample time to have been thoroughly tried, in point of fact it has been tried, and I fancy most chemists will differ with Mr. Postans when he says that "it is coming somewhat into use." The fact of an occasional specimen being sent to the Square does not justify such an assertion. Indeed, had he but said that its use had long since been given up and was not likely to be re-established he would undoubtedly have been nearer the mark.

Ebbw Vale. Arthur B. C. Orchard.

A correspondent writes,—"It is not often that the sober retail of a chemist's counter compasses a joke, but a very little grain of joke did occur among the 'straw' of daily business the other morning. A boy came in for 'Three pennyworth of powdered rhubarb, to give to young turkeys.' The retailer, with a grim appreciation of the 'litel geste,' smole to himself while he wrote on the packet the very appropriate label of 'Turkey Rhubarb.'"

W. R. Kermath.—Unless the nature of your objection to the practice were stated we do not think the publication of your letter would be desirable.

A. E. R.—Any convenient method of powdering will do, and the finer the powder is the better suited it will be for the purpose mentioned.

Ignoramus.—Spoonfuls.

E. F. Salmon.—We are obliged to you for your communication.

U. S. P.—Phosphate of potash has been recommended as useful in scrofulous and tubercular disease. According to Stillé and Maisch the dose is from 10 to 30 grains, which may be given dissolved in water.

A. J. H.—The prescription distinctly orders a preparation under a name that is to be found in the Pharmacopœia. The substitution of a non-official concentrated preparation, without communicating with the prescriber, is not justifiable.

Junius.—If the recipes already communicated have been found to be unsatisfactory, you are recommended to make some experiments towards their improvement and let us know the result.

Kino.—Kater's "compensation pendulum" had for its object the prevention of error arising from the effect of variations of temperature upon the length of a pendulum. The original description of it, with figures, will be found in *Nicholson's Journal*, vol. xx. (1808), p. 214, which is in the Society's library.

S. H.—(1) See the British Pharmacopœia, Appendix, "Weights and Measures of the British Pharmacopœia." (2) No decomposition appears probable beyond perhaps separation of colouring matter from the extract of belladonna by the acetate of lead.

J. J. Hall.—The appearance is due to a fungus (*Epichloe typhina*).

J. John.—*Cotyledon Umbilicus.*

B. Walker.—*Sedum Telephium* (*Crassulaceæ*).

Naphtha.—Wood spirit or crude methylic alcohol.

Non-Abstainer.—The ferrous salt is soluble in water, but is very readily converted by oxidation into the more sparingly soluble ferric salt.

Communications, Letters, etc., have been received from Messrs. Jones, Barbet, Hutchwen, Bentley, Inquirer.

TABLE WATER

AT HOME AND ABROAD.

"There is," says the "TIMES" in a recent article, "a pretty general admission that the present water supply is not what it should be. It is far from pure. We hear much too often from Dr. FRANKLAND about 'organic matter' and 'moving organisms.' This is by no means pleasant reading about the fluid which Londoners must drink." On the other hand, other great cities at home and abroad, and even more so the smaller towns and villages and isolated country houses, are often yet worse off. It has been shown by official inquiries published by the English Government (Reports of the Local Government Board) that of 142 *epidemics of typhoid fever observed in various localities, in* 125 *cases the epidemic had no other determining cause than the use of water containing impurities.*

The writings of Sir HENRY THOMPSON ("Times" and "Nineteenth Century") and of other Physicians ("Lancet," November 12, 1881*), indicate that the ordinary water-drinking TRAVELLER, whether at home or abroad, incurs the risk of "being laid up with a dangerous malady," and "is not unlike one who might chance to go into a chemist's shop and, without any knowledge of drugs, help himself to the contents of the first bottle that came to his hand."*

Little reliance can be felt in Filters after the evidence recently put forward by Dr. FRANKLAND, F.R.S., and others, which proved that even highly reputed filtering substances are apt to lose their efficacy with time and use, and are apt to let through water abounding in "myriads of worms," &c.

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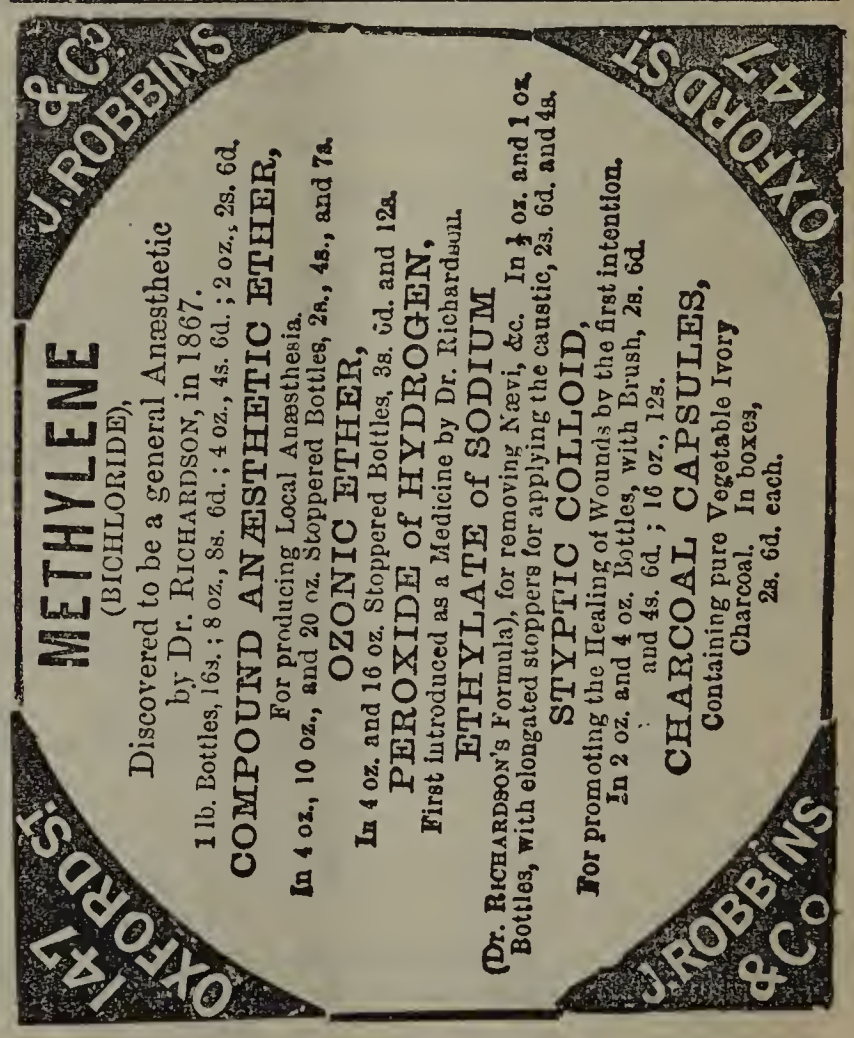

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JUNE, 1882.

41 Candidates were examined. **24** Failed. **17** Passed.

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WESTMINSTER COLLEGE.
14 presented themselves, the following **9** passed
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COOMBS, W. T. Brentford
ELTON, T. F. Cirencester
HILL, A. Leicester
COATES, U. A. Walsall
HUMPHRIES, J. Cleckheaton
RICKETTS, J. Plymouth
SPENCER, G. Hitchin
THOMPSON, C.L. London

FROM ALL OTHER
SOURCES COMBINED.
27 presented themselves, the following **8** passed.
BIRD, F. C. I. Bath
DANGERFIELD, W.H. Devizes
DARCH, A. Islington.
HALL, J. T. Manchester
LOWTHER, T.W. Cardigan
MILLS, A. E. Herne Hill
WILKINS, E. Reading
WILLCOCKS, A.S. Portsea

JULY, 1882.

At the Examinations held this month up to present date, the following Students were successful in passing their examinations from this College :—

MAJORS.

Mr. F. HOLMES | Mr. J. WHEATLEY
Mr. G. MURRAY

MINORS.

Mr. A. NICHOL
„ H. W. CAVE
„ J. BOWERING
„ J. R. EVANS
„ J. B. FOGGITT
„ H. E. CULLWICK
„ E. E. COMER
„ G. DANIEL
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Mr. J. H. GASKIN
„ T. C. HEWLETT
„ R. W. HICKSON
„ G. R. HANKINSON
„ J. H. FROST
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The last course of the present session has now commenced, which will terminate at the July examinations.

The fifth session of this School will open on September 1st, entries for which should be made to

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LOCUM TENENS or temporary ASSISTANT. Age 26. Disengaged. Town and country experience. Qualified. E. P., 59, Gibson Sq., Islington, N.

AS ASSISTANT, in-door or out, in London. Time for study preferred. Age 24. ATKINSON, 31, Thomas St., near Waterloo Rd., S.E.

AS ASSISTANT, or to MANAGE Branch. Wholesale or Retail. 11 years' experience in Dispensing and General trade. CHEMIST, 7, North Parade, Lincoln.

MANAGER of Branch, or out-door, by Registered Chemist. Married. Accustomed to Postal duties. 11 years in present situation. E. R., 11, Gloucester Rd., Birkdale, Southport.

JUNIOR, with time for study. Age 22. 7 years' experience. Town or country. Good references. W. F. GOODWIN, Post Office, Ryburgh, Norfolk.

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TEMPORARY ENGAGEMENT, for a few weeks. Satisfactory references. Experienced. Age 30. W. S. B., 16, St. John's Rd., S.E.

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AS MANAGER (branch or otherwise). Registered. Thorough practical experience in first-class business. Good references. Please state particulars and salary. CHEMICUS, 47, Tollington Rd., Holloway, N.

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AS JUNIOR, in a good house, where 2 or more assistants are kept. Age 22. Height 5ft. 9in. 6 years' experience. A. B., 2, Montpelier Parade, Low Harrogate.

RE-ENGAGEMENT, in the country. Age 31. Height 5ft. 10in. Well up in Dispensing, Prescribing, and Tooth Extracting. Z. Y., 129, Whitfield St., London, W.

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AS ASSISTANT, out-doors, or MANAGER of Branch. Married. No family. Age 30. West-end experience. Speaks French. K., 26, Vincent Sq.

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ASSISTANT. Qualified preferred. One accustomed to first-class Dispensing and Retail. Address, stating age, height, salary required, and references, to S. C., Messrs. Baiss Bros. & Co., Jewry St., Aldgate, E.C.

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AN ASSISTANT (in-doors), to Dispense. Apply, stating age, salary required, and when disengaged, to RICHARD HUNT, Chemist, Winchester.

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AN ASSISTANT. Not under 22. Accurate Dispenser. Accustomed to Dispensing and Family business. Dissenter preferred. Apply, stating height, salary required, and full particulars, to M. E., care of Messrs. Barclay & Sons, 95, Farringdon St., London.

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The
Pharmaceutical Journal
AND
Transactions.

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Pharmaceutical Society of Great Britain,

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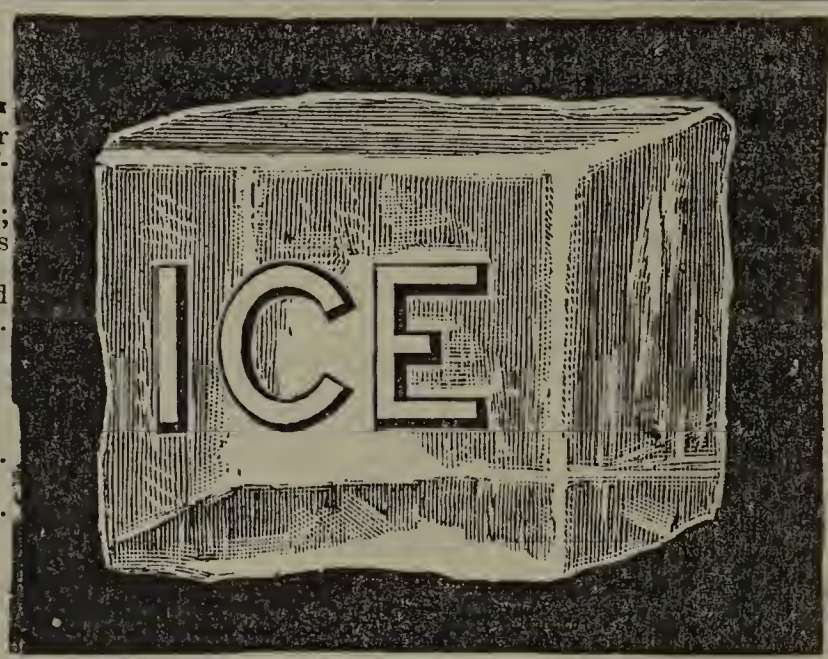

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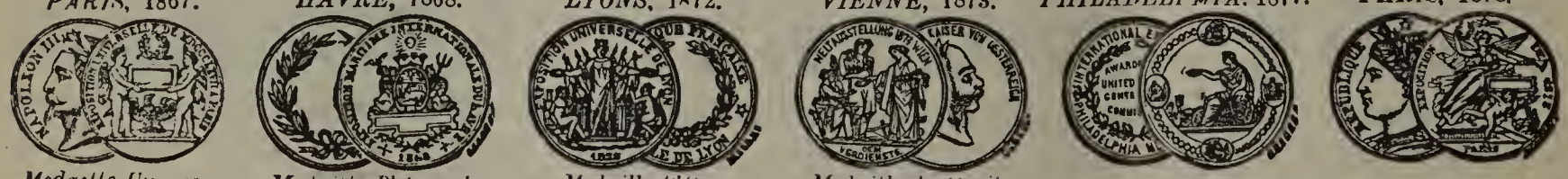

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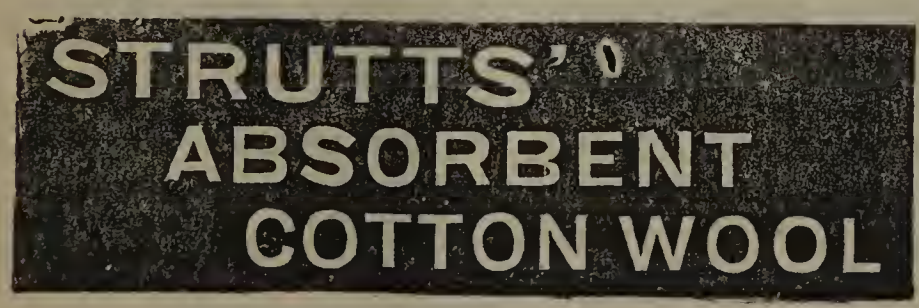

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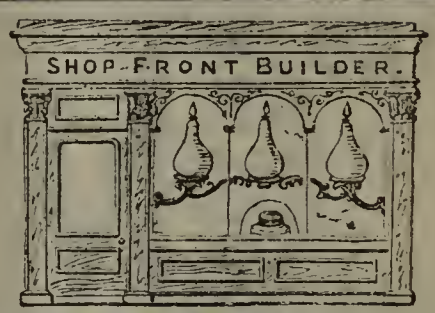

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MAIN & GEYER (*Chemists and Druggists*).

Kurrachee, India, November 29th, 1877.

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Geelong, South Australia, November 25th, 1879.

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Melbourne, Victoria, South Australia, Aug. 6th, 1879.

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"THE MONTH."

One of the most important fields of research in chemistry, and the one most likely to throw light upon the constitution of chemical compounds, is the connection, if connection there be, between the physical constants of a substance and the molecular weight corresponding to the formula supposed to represent its constitution. The connection traced by Professor Kopp between the chemical constitution of organic substances and their boiling points has already led to important results. More recently the researches of Prof. Hartley (*Pharm. Journ.*, [3], xi., 54) upon the relation between the chemical constitution of certain organic compounds and their action upon the ultra violet rays have revealed interesting and important connections. In the *Philosophical Magazine* for this month Dr. E. J. Mills has recorded the results of a series of careful experiments, made with the view of finding if any connection obtains between the chemical constitution of a number of typical organic compounds and their melting points. Many difficulties have previously stood in the way of the accurate determination of melting points, the foremost being the want of thermometers which not only should be sensitive to heat but also capable of indicating changes in temperature corresponding to minute fractions of degrees. Dr. Mills himself has considerably aided in this direction, and has devised a very accurate method of determining melting points (*Proc. Roy. Soc.*, xxxiii., 203). In short, it consists in observing the indications given by a very delicate mercurial thermometer, and then comparing these with those of the air thermometer, the actual melting point being expressed by the indications of the air thermometer. Of course a very great number of accurate determinations of melting points must be effected before an induction can be made of the connection with the chemical constitution. Yet making but a comparatively small number of experiments upon specially prepared substances, Dr. Mills has arrived at conclusions which are as interesting as they are important, and at least indicate the existence of a relation between the chemical and physical constants. The following table indicates an interesting connection between the molecular weight and the melting point:—

		Molecular weight.	Melting point.	$\phi = \frac{\text{M.P.}}{\text{M.W.}}$
Dichlorobenzene	$C_6H_4Cl_2$	=147	52·821	0·35933
Bromaniline	C_6H_6BrN	=172	61·742	0·35971
Trinitrotoluene	$C_7H_5(NO_2)_3$	=227	80·532	0·35477

Thus the melting point of the above compounds being unknown, it could be found by multiplying the molecular weight by the constant ϕ, which in the above cases has been obtained by dividing the melting point by the molecular weight. In the case of nitro-compounds the amount of the (NO_2) group introduced seems to be correlative with a constant difference in melting point. Isomeric compounds, as might be expected, differ in their melting points, but Dr. Mills has further shown by the accuracy of his method that isomerism probably exists in certain cases where it was not previously suspected.

Mr. F. D. Brown (*Phil. Mag.*, July, 1882) has made some experiments with the view of facilitating not only the construction of an accurate thermometer but also the methods of making the corrections which are necessary even with the most delicate instruments. In the researches of Dr. Mills, the readings of the mercurial thermometer were not themselves taken as the ultimate indications of temperature, but were referred to the readings of an air thermometer, this being taken as the standard. Mr. Brown has experimented in order to determine whether an accurate method can be devised which shall not incur the large expenditure of time and trouble involved by this method. Two mercurial thermometers were constructed, the details being described fully in the paper, and it was found that these gave almost identical readings. Hence an accurately constructed mercurial thermometer is capable of being used as a standard, and, further, is capable of replacement by another if broken or otherwise destroyed, without the indications of the second being appreciably different from those of the first. Experiments were then made to discover the most accurate method of determining the zero point. It was found that a mixture of distilled water and ice yielded more accurate results than were obtained by the use of melting ice alone, as ordinarily recommended.

An experiment performed by Mr. Fletcher, of Warrington, at the *soirée* of the Society of Chemical Industry, has given rise to some rather wild comments in the newspapers concerning a new theory of combustion. On the occasion referred to, Mr. Fletcher heated a large mass of iron wire red hot in a gas flame, into which he directed a blast of air that was gradually increased until the flame was no longer visible. As the flame became smaller the temperature increased, until at length the iron melted and ran into drops, though no flame could be seen. The *Chemical News* quotes an account of this experiment which describes the results as being so totally unexpected that many persons present were under the impression some deception was being practised; but such a view of the matter would seem to be more suited for the gratification of admirers of the marvellous than for acceptance by minds accustomed to observation and inquiry. That the flameless, or as it might more correctly be termed non-luminous, combustion of hydrocarbon gas should be attended with a greater heating effect than the luminous combustion of the same gas is a self-evident result rather than otherwise. Such non-luminous combustion of the gas means the existence of conditions under which the elementary constituents combine with oxygen simultaneously, and not one after the other to any extent sufficient for the elimination of carbon particles in the solid state, as in the luminous flame. Under such conditions, the degree of heat produced would naturally be the highest attainable with the material burnt, and the local temperature would be proportionate to the rate of combustion, because there would be less opportunity for loss by radiation and conduction than when the oxidation of the burning materials was more progressive.

The various technical journals have recently described two electrical inventions based on the principles of Professor Hughes's induction balance, which promise to be of great importance in the immediate future if present anticipations of their value are realized in actual practice. These are the "torpedo detector" of Captain M'Evoy, and the "divining rod" of Mr. C. F. Varley. It is thought that Captain M'Evoy's invention will also be found of utility in detecting the whereabouts of lost anchors, etc. The apparatus consists of a small mahogany box containing a pair of coils or bobbins

and a vibrator, similar to that of electric bells, and a telephone. To this box is attached a given length of flexible cable containing four conducting wires. To the other end of this cable is attached a flat wooden case, in which there are two coils. This case is weighted so as to readily sink in the water. There are terminals on the box for attaching battery wires, and a suitable switch arrangement for turning the current on and off is provided. One complete primary and one complete secondary circuit pass through the box, cable and wooden case. The battery, the vibrator, one coil in the box and one coil in the wooden case form the primary circuit, while the telephone and the two remaining coils form the secondary circuit. The coils are so adjusted that little or no noise from the vibrator is heard in the telephone. Thus adjusted the instrument is ready for work; if the flat wooden case is now brought near a metallic body a loud noise is heard in the telephone, thus indicating the proximity and locality of such a body.

Mr. Varley's divining rod, which makes use of the underlying principles of the preceding invention, is for the purpose of ascertaining the presence or absence of an underground mineral lode. The comparative complexity of the instrument renders it difficult to make a useful abstract description of it. Good detailed descriptions of this instrument and also of Captain M'Evoy's torpedo detector will be found in the *English Mechanic*, xxxv., p. 441.

A few weeks ago Messrs. Jamin and Maneuvrier described to the Academy of Sciences some remarkably interesting and novel effects produced in the well-known "electric egg" by Gramme alternating currents. The experiments appear to have had for their object the investigation of the alternating electric arc *in vacuo*. The authors say that the phenomenon to which the two currents contribute equally is that of Geissler tubes, but of far greater brilliancy owing to the considerable currents of electricity passing. The carbon rods get heated, redden, and reach a pale white heat, not merely at their extremities but throughout their entire length: they are then rapidly volatilized through the combined effects of heating and disintegration. Whatever be the cause of this volatilization the authors state that it is certain that a carbonaceous matter spreads in the state of vapour. In the earlier experiments the globe became filled with a blue gas, like the vapour of iodine, deepening in hue to indigo, and this vapour is abundantly condensed on the glass, rendering it opaque. This termination was avoided by using two cone-shaped bundles of carbons instead of the two single rods used previously, which obviated the volatilization. Still brighter effects were obtained by using copper rods instead of the carbons. The authors have followed up this line of inquiry and in a more recent paper have described the effects produced in the vacuous globe when sulphide of carbon vapour is present. The carbons in these experiments were parallel, fixed at the base and separable at the top by a simple mechanism; in fact, forming an electric candle similar to the one devised by one of the authors (Jamin). With a vacuum as complete as possible in the receiver, the arc, of course, does not form, and the Geissler tube phenomenon is present instead; but when a few drops of sulphide of carbon are introduced, increasing the pressure about 0·05 m. or 0.06 m., the arc appears between the points, and it persists as they are separated. At this moment there is, as it were, an explosion of light, unbearably bright and incomparably superior to the usual brilliancy of the arc. Through coloured glass the arc appears to be of horseshoe form, or like a large omega, resting with its two ends on the carbon points, and about 0·05 m. in height. A long flame rises vertically from this arc. The points of the carbons seem red and very brilliant, but the arc is pale green, and as this colour dominates, the whole room appears as if illuminated by a Bengal flame with copper in it. The brilliancy increases with increase of tension of the vapour; but, the resistance also increasing, the arc may go out and have to be started again and again. The spectrum of the light is formed of four channelled spaces in the red, the yellow, the green, and the violet, very similar in appearance, though the green is the most luminous. They are believed by the authors to obey the same harmonic law, which remains to be discovered. If air remains in the receiver the sulphide of carbon burns incompletely; a cloud of sulphur fills the space and is deposited on the glass, the carbon alone burns. If the exhaustion is nearly complete these clouds are not formed, but a brown deposit forms instead, which turns black. This deposit is volatile; its odour resembles that of sulphur. The authors regard it as a compound of sulphur and carbon. In summarizing, the authors conclude that these experiments are remarkable for the extraordinary amount of light produced, for the size of the arc, for its colour, for the constitution of its spectrum, and for the chemical actions which take place. They think it is not probable that it could ever be turned to account for illumination on account of its colour, unless for lighthouses and signalling at a distance.

Some interesting experiments are recorded in *Nature* (July 13, p. 246), by Mr. J. W. Swan, on the effect of strong sunlight in altering the perception of colour. He finds that by looking at a sheet of white paper while strong sunlight fell on it for two or three minutes the eye became red-blind to colours seen in the shade, but that the reverse effect was produced with respect to flowers seen in a strong light. This effect, however, passed off in a few minutes. These observations may perhaps throw some light on cases of colour blindness which have not a congenital origin.

A suggestive paper in *Nature* (June 22), by Dr. W. Ramsay, is devoted to the enunciation of a theory to account for the sense of smell. Assuming that the sense of smell is excited by gases only, including under this term the vapours of liquids and solids which have a low vapour tension and consequently give off vapour at the ordinary temperature, he points out that all gases which have no smell, or produce simple irritation of the nostrils, have low molecular weight, and that increase of molecular weight (*i.e.*, in gases increase of specific gravity) in compounds of the same class is correlative with increase in the intensity of their smell. Thus methyl alcohol, in a state of purity, is odourless; ethyl alcohol, when freed from ethers and as much as possible from water, has a faint smell, and the odour rapidly becomes more marked with each rise in the series till the limit of volatility is reached and solids are arrived at with such a low vapour tension that they give off no appreciable amount of vapour

at the ordinary temperature. Dr. Ramsay gives many other similar illustrations and lays down the proposition that to produce the sensation of smell a substance must have a molecular weight at least fifteen times that of hydrogen. This he thinks can be sufficiently explained by the hypothesis of vibration, the period of vibration of the lighter molecules being too rapid to affect the sense, though the point at which the vibrations begin to be perceptible varies in different individuals. On the other hand it is thought doubtful whether there exists a lower limit to the sense of smell, the vapours of osmic acid, carbon tetrabromide, selenium, tellurium, and arsenious and antimonious oxides, which are among the heaviest known, having a most distinct smell. The intense perfume of flowers is ascribed to terpenes or their products of oxidation, which have a specific gravity with which is associated a rate of vibration that appears to excite the olfactory nerve most powerfully. The paper also contains some ingenious speculations as to the rate of the vibrations and the extent to which smell may resemble sound in having its quality affected by harmonics.

The effects produced by various chemical compounds upon unstriated muscle have been the subject of some recent experiments by Herr Nothnagel, the results being of considerable interest (*Lancet*, July 8, p. 25). The experiments were made upon etherized rabbits, the open abdomen being placed in a warm neutral solution and the chemical substance placed gently, in a solid form, upon the external surface of the bowel. It was found that the result produced was characteristic of the basic rather than of the acid constituent of a salt. A fundamental difference was observed in the action of potash and soda salts; a potash salt producing instantaneously a strong muscular contraction, limited to the part touched or extending round the intestine in an annular direction, whilst a soda salt produced a contraction that was not limited to the part touched, but extended for several centimetres, though always in an upward direction towards the pylorus. So characteristic is this action of a soda salt that in a case where it was desired to ascertain which was the upper and which the lower portion of a piece of exposed bowel, it would only be necessary to place upon it a fragment of common salt, which would produce a contraction that would invariably pass upwards. Several other chemical compounds were tried, but the most striking results appear to have been obtained with the potash and soda salts.

Some interesting speculations have been put forward by M. Corne (*Journ. Pharm. et de Chimie*, [5], vi., 17) as to the phenomena of the phosphorescence and oxidation of phosphorus. He has found that if fragments of phosphorus be allowed to lie in boiled distilled water, which is in contact with pure oxygen under diminished pressure, a time arrives when if a stick of phosphorus be plunged into the oxygen, although this is still in an uncombined state, there is no longer a production of phosphorescence or fumes. It is conjectured that the vapour emitted by the phosphorus under the conditions of the experiment passes from the distilled water upwards into the oxygen, but arrives there in a state in which oxygen is no longer capable of acting upon it, and that eventually the oxygen becomes saturated with this vapour, and is then incapacitated from acting upon phosphorus brought directly into contact with it. M. Corne infers, therefore, that the vaporization of phosphorus, and not oxygen, is the principal cause of phosphorescence and fumes, but that for their production it is necessary that the vaporization should take place in the presence of that gas. Further, he believes that phosphorus is not attacked directly by ordinary oxygen, but that in the vaporization electricity is generated, which, acting upon the oxygen, throws it into the form of ozone, and that this ozone attacks the phosphorus vapour with evolution of heat and light (phosphorescence), whilst the vapour passing instantaneously from the gaseous into the solid state forms fumes. Of course these conjectures will be entirely upset if it turns out, as might be expected, that the oxygen does not remain free, but enters into combination with the phosphorus vapour.

If the inferences drawn from some experiments by M. Combe, which have been brought under the notice of the Academy of Sciences by M. Wurtz (*Comptes Rendus*, xciv., 1717), prove to be correct, it is probable that any disturbance of the quinine market through the synthesis of that alkaloid by M. Maumené will be postponed for the present. It will be remembered that M. Maumené claimed that the preparation of a new compound, NH_2, had enabled him to complete the synthesis of quinine, and pending therapeutic experiments with the product he deposited a sealed packet with the Academy. M. Combe has been tempted to repeat the experiments, but he fails to find any particular novelty in the carbonate obtained in the way indicated by the action of potassium permanganate upon ammonium oxalate, since it appears to be nothing more than a compound of ammonia and carbonic acid, which is not exactly the missing link that was supposed to be hidden in the sealed packet.

In the *American Journal of Pharmacy* Dr. T. G. Wormley answers in the negative the question, "Is gelsemic acid identical with æsculin?" and states that the two differ chiefly in the following particulars:—Gelsemic acid crystallizes very readily (even the $\frac{1}{10000}$ of a grain separating in needles from 1 grain of solution), requires 29·12 parts of water for solution, is soluble in 330 parts of ether, freely soluble in chloroform, and gives a copious yellow precipitate with corrosive sublimate. Æsculin, on the other hand, does not crystallize except from strong solutions, is soluble in from 300 to 576 parts of water and in 36,000 parts of ether, nearly insoluble in chloroform, and gives no precipitate with corrosive sublimate.

In a recent communication to the Academy of Sciences (*Comptes Rendus*, xciv., 1722) M. Chapoteaut described a pulverulent white body that had been obtained by precipitating with 95° alcohol an aqueous solution of gastric juice that had been first dried and washed with ether. Finding that alcohol appeared to modify the precipitate, the aqueous solution was acidulated with sulphuric acid, which even in excess does not redissolve the precipitate, whilst hydrochloric acid dissolves it readily (*Comptes Rendus*, xcv., 140). In this way he obtained a white precipitate, closely resembling an albuminoid in composition, which appeared to constitute the active portion of the gastric juice, and which he considers is entitled to the name "pepsine." It dissolves in water at the ordinary temperature to the extent of 2 grams to the litre. It is soluble in alkalies, being precipitated from such solutions by acids whilst gradually losing its properties. This "pepsine" occurs

in the gastric juice as a salt of potash, together with another albuminoid without solvent action on blood fibrin, and a fat acid without solvent action and incapable of displacing the pepsine from its potassic combination.

A lengthy and very interesting communication by Dr. Julius Wortmann throws some fresh light upon the capabilities of bacteria (*Zeit. f. Phys. Chemie*, vi., 287). The rapidity with which these organisms multiply in a solution containing albumenoid matters is now well known. According to the views held by Dr. Wortmann the change which takes place in the albuminoid is first excited by a peptonizing ferment, which under these conditions is abundantly secreted by the bacteria. The product of the action of this ferment upon the albumenoid matter is considered to constitute the food of the bacteria; in proportion, therefore, to the activity of the ferment the necessary nourishment is provided in quantity favourable to the multiplication of the bacteria, and these again yield an increased secretion of ferment. The present experiments of Dr. Wortmann were intended to ascertain what takes place in the absence of albumen, and when starch is the only source available to the bacteria for the carbohydrates necessary for their growth. In this case Dr. Wortmann says the bacteria secrete another special ferment, which is not peptonizing, but acts upon starch in every respect similarly to diastase, and like diastase is soluble in water and precipitated by alcohol. It will be observed that in both these cases it is assumed that the ferment is derived from the bacteria, and that therefore these organisms are capable of secreting different ferments, according to the necessities imposed by surrounding conditions. But, bearing in mind the recent statement of M. Béchamp (see before, p. 66) that "albumenoids" contain a ferment within themselves, which is confirmed by the research of M. Chapoteaut referred to in the previous paragraph, as well as other known facts, it does not seem impossible that the first action of bacteria may be to release from the particular substance which they attack the ferment by which it is eventually to be digested or saccharized, as the case may be. This would be quite consistent with the conclusions published by Messrs. Gautier and Étard in recent communications to the Academy of Sciences upon the chemical mechanism of putrefaction (*Comptes Rendus*, xciv., 1357, 1598). They are of opinion that the molecule of albumen is split up under the influence of bacteria into a number of less complex bodies that previously existed within it as nuclei, and it is worthy of notice that they state that in the case of beef muscle, at the very commencement of the process, there is an oozing of a clear syrupy liquid which appears to be the result of digestion of the flesh by a ferment belonging to it.

Two "new antiseptics" are described by M. Le Bon (*Comptes Rendus*, xcv., 145), a glyceroborate of calcium and a glyceroborate of sodium. They are prepared by heating together, with constant stirring, equal parts of borate of lime, or soda, and glycerine, until a drop removed and placed on a glass plate forms a brittle transparent pearl. Upon being poured out to cool the product forms a transparent glassy mass, soluble in alcohol and water, which, being very hygroscopic, is broken into fragments and kept in stoppered bottles. The glyceroborate of sodium is soluble in water in all proportions, and even in dilute solution is said to be a powerful antiseptic, though so non-irritating that a concentrated solution may be applied to the eye and other delicate organs without inconvenience. A simple coating of meat with a varnish of glyceroborate is said to be sufficient for its preservation. The similarity of these bodies to another recently referred to in these columns is obvious.

At a meeting of the Royal Society of Edinburgh, on June 19 (*Nature*, p. 264), Dr. Dobbie and Mr. G. Henderson communicated the results of analysis of the dragon's blood of Socotra obtained by Professor J. B. Balfour during the expedition to that island. The resin which is obtained from *Dracæna Cinnabari* differs considerably from the other kinds met with in commerce. The authors came to the conclusion also that different species of the same genus yield the same resin, but that the dragon's blood of commerce is derived from plants of different genera.

A material for a varnish, possessing properties that may perhaps be turned to account in pharmacy, has been discovered in aluminium palmitate (*Amer. Journ. Phar.*, p. 371). This substance melts at a higher temperature than dammar and copal, is readily soluble in oil of turpentine and benzol, and the varnish so made dries readily, remains permanently pliable, has a silky lustre, is insoluble in water and does not penetrate through paper.

In the course of some experiments undertaken with a view to investigate the nature of lignin, Herr Singer made the observation (*Monatshefte*, iii., 395) that an extract obtained by boiling pine wood in water, which presented all the characteristic reactions of woody tissue, had, when filtered and evaporated, a distinct odour of vanillin. This led him to try the behaviour of the same reagents (phloroglucin and hydrochloric acid, aniline sulphate, indol, etc.) with pure vanillin, upon which it was found they produced practically the same effect. The experiments were then extended to extracts from other woods, as well as from lignite and decomposing woods, and in every case with the same results as to colour reaction and odour. It was also found that the liquids that held the body presenting these characters in solution,—water, alcohol and soda ley,—were those in which vanillin is soluble, and that both bodies were decomposed at the same temperature. Herr Singer is therefore inclined to believe that the colour reaction and odour always observed in an aqueous extract from woody tissue are due to the presence of vanillin, in which case that body would be one of the most widely diffused in nature. Moreover, from the fact that in successive decoctions of the same woody tissue the same results were always obtained, it would appear that either lignin is a complex body from which by heating in water vanillin is continuously split off, or that the substance known under the name of "lignin" is a mixture of chemical individuals, among which vanillin is a constant constituent. Other bodies found constantly associated with woody tissue were a substance corresponding to coniferin, from which vanillin was first prepared artificially, and a kind of gum.

The astringent bark of the West Indian sapotilla tree (*Sapota Achras*) has been recommended for use as a tonic and febrifuge. It has been recently examined by M. Bernou, who reports (*L'Union Pharm.*, xxiii., 291) that he has obtained from it a crystalline alkaloid, soluble in ether, chloroform and alcohol, and insoluble in water, which he has named "sapo-

tine." It forms a crystallizable hydrochlorate. From acid solutions the alkaloid is precipitated by ammonia, and it can also be removed by shaking with ether. The bark also yielded a large quantity (11·8 per cent.) of "sapotannic" acid, as well as two resins, one soluble and the other insoluble in ether.

At a recent meeting of a Medical Society, in Berlin, Dr. Schiffer called attention to a preparation that he thought might prove useful in the treatment of spasms, tetanus and similar affections of the nervous system (*Zeit. d. allg. öst. Apot.-Ver.*, xx., 253). It consisted of an aqueous extract of the "guachamacha," a South American member of the oleander genus, which has a considerable reputation among the natives. Its active constituent is an alkaloid soluble in water, slightly soluble in absolute alcohol, and almost insoluble in ether and chloroform. In this it resembles curare, as well as in the fact that the active constituent is almost completely precipitated by tannin. It further resembles curare in its paralysing action, with the difference that the respiration is not affected.

An action similar to that of digitalis, but without its inconveniences, is, according to Messrs. Sée and Bochefontaine (*Comptes Rendus*, xcv., 51), exerted by the lily of the valley (*Convallaria majalis*), together with diuretic properties beyond those possessed by any other agent known. In the account of their physiological experiments given to the Academy of Sciences, Messrs. Sée and Bochefontaine spoke of having used an extract of the entire plant and one of the flowers, the latter having been found the most powerful. In mentioning the subject subsequently, however, at a meeting of the Academy of Medicine (*Lancet*, July 15, p. 83), Professor Sée attributed similar properties to a new alkaloid that had been isolated from the lily of the valley by M. Hardy, to which the name "convallarine" has been given.

The leaves of *Globularia Alypum*, or wild senna, used in the south of France as a substitute for senna, have been recently investigated botanically, chemically and therapeutically by Messrs. Heckel, Mourson and Schlagdenhauffen. They find that the active principle, globularin, does not yield two products of decomposition when treated with acid, as stated by Walz, but only one, which they have named "globularetin." It is oily and resinous looking and becomes a transparent uncrystallizable mass, which under the action of caustic alkalies is transformed into cinnamic acid by taking up the elements of water. *Globularia* also contains a small quantity of a volatile aromatic substance which appears to be cinnamate of benzyl.

In the *Practitioner*, for July (p. 32), several pages are devoted by Dr. L. Shapter to *Herba Pulsatilla*, under which he includes *Anemone pratensis*, D.C., and *A. Pulsatilla*, L. It is the former of these that was recommended by Baron Störck under the name of *Pulsatilla nigricans* and which is still used extensively by homœopaths. It differs from *A. Pulsatilla* in having smaller pendulous flowers of a dark purple, with sepals connivent at the base and acute and reflexed at the tips. This plant has not as yet been recorded as occurring in this country. Dr. Phillips attributes the activity of the plant to anemonin, a crystalline principle obtained by distilling the herb with water, concentrating the distillate and purifying the resulting crystals from the inert anemonic acid by solution in alcohol, in which the anemonin is soluble. As this principle is found in several other plants of the same order, *e.g.*, *Anemone nemorosa*, *Ranunculus Flammula*, *R. sceleratus* and *R. bulbosus*, it would decide the question whether the *Anemone Pulsatilla* or *A. pratensis* is the more valuable of the two, if anemonin were experimented with instead of the crude herb. As is the case with several of the Ranunculaceæ the dried herb is much less active than the recent one, but Dr. Shapter does not state which he has used. The strength of tincture he recommends is 2½ ounces of the herb to one pound of spirit, the dose being from ♏v. or x. to ʒss. Hitherto, pulsatilla has been used chiefly as a remedy for mucopurulent discharges, especially in patients of a lymphatic temperament; but Dr. Shapter, led by the statements of Clarus and Orfila, that the plant has a stupefying or paralysing action on the nervous system, to investigate further, has arrived at the conclusion that pulsatilla is a sedative to the sympathetic nervous system. As anemonin is but little soluble in cold alcohol or cold water, it seems doubtful whether the properties that Dr. Shapter attributes to pulsatilla are due to the anemonin or to some other principle not yet detected in the plant. It is noteworthy, however, that he states that he believes the addition of tinct. chloroformi to a ♏xx. dose (anemonin is readily soluble in chloroform) assists the action of pulsatilla.

The New Zealand remedy for diarrhœa, called "koromiko" (*Veronica salicifolia* and *V. parviflora*), seems to be more valued in China than in this country. Dr. J. Jardine, writing from Kiukiang, in the 'Chinese Imperial Maritime Customs Medical Reports,' says that he was induced to try koromiko in dysentery and diarrhœa. Some of the results obtained exceeded his most sanguine expectations, cases of dysentery which had varied in duration from six weeks to four years being cured by four or five doses of the drug. He adds, "Judging from the few cases I have been able to follow, I augur a brilliant future for this remedy in the chronic forms of the disease."

It has long been known that opium has a beneficial influence in diabetes, diminishing thirst and the excretion of urine, while the proportion of sugar in the urine becomes less. Dr. R. S. Smith, in the *British Medical Journal* (p. 933), states his opinion that this action is due to codeia, which he has given with beneficial effect in this disease. The doses he gives are from 1 to 6 grains three times a day.

In *El Sentido católico en las Ciencias Méd.*, in an article by Dr. F. Guermonprez, attention is directed to the variable action of santonin, and its occasionally poisonous action. It would be interesting to determine how far this may be dependent upon the active principle being prepared from different samples of the crude drug, two or three varieties obtained from different plants being met with in commerce.

Preparations of box in one form or another have been frequently used as remedies for fevers, intermittent and otherwise, in France, Italy and Germany. The remarkable results obtained in the treatment of fever in Italy, in 1838, with Pavia's so-called buxine, by Tibaldi, Buzzoni and others, show that even in the impure form the box alkaloids have a powerful therapeutical action. Dr. Alessandri has therefore done good service in investigating the best method of extracting the alkaloidal and other principles of box leaves and bark (see before, p. 23). There seems to be little doubt that he has succeeded in isolating one at least of the alkaloids of the *Buxus*, thus

giving experimental therapeutists the opportunity of working with a definite chemical compound and obtaining some trustworthy information on the subject. The most complete treatise on the medicinal properties of box is to be found in a thesis read by M. G. Bazoche before the Faculty of Medicine of Strassburg, in 1859. The remarkable experiments of Drs. Ringer and Murrell with extract of box as an exciter of tetanus in frogs, prove that whether or not the box tree deserves the name of the "poor man's cinchona" bestowed on it by Dr. Alessandri, it possesses most extraordinary physiological properties, and hence ought in all probability to be a powerful therapeutical weapon.

One of the characters formerly given for distinguishing belladonna root was the invariable presence in it of starch. Herr Brandes has, however, pointed out that belladonna root sometimes occurs perfectly free from starch, and he has expressed an opinion that in any case the quantity present is dependent upon the period of vegetation. He states that he has found that the young roots always contain starch, but less in the spring than in the autumn, whilst the older roots are rich in starch in the spring and autumn and contain less in the summer. Some experiments made by Herr Buddel (*Archiv*, xx., 414) appear to indicate that there is some correspondence between the variations in the amount of starch and the amount of atropine, and that roots that are richest in starch contain most alkaloid. They failed, however, to confirm Herr Brandes' conjecture as to the amount of starch in the root being affected by the period of vegetation, for of two specimens, collected at the same period in spring and in the same locality, one, which yielded alkaloid equal to 0·625 per cent. of the dried root, gave no reaction with iodine or perchloride of iron, showing absence of starch and tannin compounds, whilst the other, which yielded 1 per cent. of alkaloid, contained starch. Herr Buddel infers that the roots devoid of starch are derived from young plants, since it is probable that the proportion of alkaloid in a root will increase year by year up to a certain point. It must be remembered, however, that M. Lefort (*Pharm. Journ.* [3], ii., 1031) came to the conclusion that the older the root the smaller is the proportion of atropine it contains, he having obtained about as much again from roots two to three years old as from those seven or eight years old.

At a meeting of the Linnean Society last month, Mr. C. B. Clarke exhibited a large bundle of plants gathered that morning by him in Hampshire, among which the *O. incarnata*, Linn., *O. incarnata*, Syme, and *O. maculata*, Linn., were readily distinguishable at a glance. The first-mentioned has been described by Mr. C. B. Clarke (*Journ. Lin. Soc.*, vol. xix., p. 206), as a species long overlooked in this country. It resembles *O. latifolia*, but is a shorter plant, has leaves of a pale green colour, and never spotted. The flowers are of a pale flesh colour, with a yellow lip, fading to a sallow yellow. The margin of the lip has a line, sometimes bright rose when young, but the flowers never have any purple about them. The plant has been found in Hampshire and Cornwall.

In the *Bull. de la Soc. Linnéene de Paris* (p. 317), Professor Baillon describes a new *Cinnamodendron* from Porto Rico, under the name of *C. macranthum*. It has shorter, broader, and more obtuse and rigid leaves than those of the false winter's bark tree, *C. corticosum*; they are also a little oblique at the base; the secondary veins are more numerous, parallel, and forming a sharper angle; the flowers are much larger, being two centimetres every way. An interesting feature in the plant is the fact that the intermediate petals between the exterior and the interior ones, which in *C. axillare* and *C. corticosum* are considered as scales, are so placed (forming false whorls of three pieces) that he believes it ought to modify the present opinions upon the interpretation to be given to the different floral appendages in this genus, which in this particular recall those of the Magnoliaceæ, and he regards the genus *Cinnamodendron* as bearing the same relation to other Magnoliaceæ as *Monodora* to *Anona*.

The cause of the direction of growth of pollen tubes has been investigated by Dr. L. Kny, who has endeavoured to find out, by experiment, whether Sachs' theory that the direction is caused by the arrest of growth on the side in contact with the solid substance of the stigma, or that of Darwin's, that it is due to the effort to avoid the light, be correct. He immersed pollen grains in a mixture of gelatine (first warmed) and a solution of sugar with a very small quantity of extract of meat, in which nutrient fluid they readily put forth their tubes. He found that neither the spot to which the pollen tube attaches itself, nor the direction which it afterwards takes, nor the rapidity of its growth, is in any way affected by gravitation, by light, or by contact with a solid substance (*Journ. Micr. Soc.*, June, p. 372–3).

In the *Mém. de la Soc. des Sc. Nat. de Cherbourg* (vol. xxiii., p. 209, pl. iv., 11), Dr. E. Janézewski gives an account of the development of sieve tubes from the cambium cells in certain dicotyledons, monocotyledons and acotyledons. In the first-mentioned class the tubes are, after once becoming passive, rapidly replaced by the activity of the cambium; but in monocotyledons the activity of the tubes lasts much longer, in fact, as long as the organ in which they are found. In vascular cryptogams the dots in the tubes always remain closed, not giving place to perforations as in mono- and dicotyledons.

The foxglove seems to have grown very luxuriantly this year. A writer in the *Garden* (p. 6), describes a plant which he saw in a garden at Hastings as 9 feet high and not then fully grown; the flowering portion of the spike being two-thirds of that length, the central spike branching out below this point into several minor ones. A Cornish correspondent at Penzance sends a local newspaper cutting to the effect that in the beautiful Trelowarren Woods, so well-known to all visitors to the Lizard, a foxglove was found which measured 10 feet in height.

At the Botanical Gardens in Regent's Park a plant of *Pilocarpus pennatifolius* flowered for the first time in the early part of this month, its pendent spike of purplish flowers measuring about 1½ foot in length. The blossoms opened almost simultaneously and lasted only about three days, the petals soon falling off. The carpels in the young state appear to be erect and close together as in the star anise.

At Kew the sumbul plant has flowered again this year and is now forming fruit, all the stem-leaves having died down. The berries of the mezereon are now beginning to assume their beautiful scarlet hue. Even if gathered green and dried this colour is developed, showing that it is not dependent on light so much as on chemical change.

In the London drug market this month some of the false arnica, described last month, was offered for sale. Among other unusual drugs were aricine bark (*Cinchona pubescens*), in fine pieces, the flowers of *Artemisia judaica*, and the root of a species of *Camphorosma*, probably *C. acuta*, L., from the Persian Gulf. The *Artemisia* was examined a few months since by Merck, of Darmstadt, who obtained from it a fragrant volatile oil, and a bitter principle (glucoside). The *Camphorosma* is used as an excitant, diaphoretic and diuretic in asthma, rheumatism, and chronic skin diseases. Under the name of coto bark, a pale, aromatic, bitter, but not pungent, bark has been offered. It is probably the bark of a species of *Croton*, the flavour having a family likeness to that of cascarilla. Spurious saffron, of the kind described by Hanbury as being adulterated with carbonate of lime, is still extant in English commerce, two samples having recently been obtained in London.

CONTRIBUTION TO THE KNOWLEDGE OF THE ALKALOIDS OF PAPAVERACEÆ.*

BY PROFESSOR J. F. EYKMAN, OF TOKIO.

Concerning the alkaloids of the Papaveraceæ we have, at present, more or less extended researches on *Papaver somniferum* and *Rhœas, Chelidonium majus, Glaucium luteum, Sanguinaria canadensis* and *Eschscholtzia californica*. Probably the most study has been bestowed upon the alkaloids of opium (from *Papaver somniferum*) and we owe particularly to the grand labours of Hesse a knowledge of different series of homologues existing in opium, among which are at least fifteen well-defined alkaloids. The interesting labours of Wright, Beckett, etc., have considerably increased the number of these homologous series by the preparation of many derivatives, and have furnished many clues to a knowledge of the constitution of these bases.

Much less attention has been paid to the other papaveraceous plants, and the number of alkaloids which they contain is much smaller. Besides the poisonous sanguinarine (=chelerythrine), which is characterized by the orange-red colour of its salts, a second alkaloid yielding colourless salts has been met with in all these plants. Chelidonine was discovered by Godefroy in the root of *Chelidonium*; glaucopicrine in the root and glaucine in the leaves of *Glaucium luteum* by Probst; Riedel discovered in the root of *Sanguinaria* the alkaloid named by Gibb "porphyroxine," and Walz found in the *Eschscholtzia* a bitter and an acrid alkaloid. Wayne claims to have found a third alkaloid in sanguinaria root, which Gibb called puccine.

Of all these bases, only sanguinarine and chelidonine have been somewhat carefully studied; while the data respecting the others are insufficient to properly characterize them.

Since the number of alkaloids known to exist in opium has risen to at least fifteen, it may be suspected that it merely requires a further research to find, in the other papaveraceous plants, a still greater number of alkaloids belonging to homologous series. The great difficulty of separating the latter and obtaining them pure, and the fact that many supposed opium alkaloids formerly accepted have in late years turned out to be mixtures of several others, lend great probability to this suspicion.

A more detailed study of these plants is desirable and very interesting also for another reason. Namely, it is a remarkable fact that, while one and the same alkaloid (sanguinarine) has been shown to exist in all the other papaveraceous plants, it does not appear to occur in *Papaver*, and none of the substances found in opium seems to be identical with any of those extracted from other members of the family.

Hence, while sanguinarine constitutes a chemical link between most of the Papaveraceæ, no such link seems to exist between these and *Papaver*. The name porphyroxine, which has been applied to two different substances, one prepared from sanguinaria and the other from opium, does not imply that these two bodies are identical; besides one of these has since been shown to be a mixture.

The analogies which may be traced between sanguinarine and some of the alkaloids of opium,* though not at present to be depended on, at least justify the supposition that a more exact study of the Papaveraceæ will show the alkaloids existing in them to be either identical or isomeric with those of opium, or to form new members of the homologous (or isologous) series.

The discovery of such alkaloids, identical or homologous with those of opium, would not only form an additional proof of the chemical relationship of *Papaver* with the other Papaveraceæ, but would also perhaps permit the employment of some of the latter for the preparation of alkaloids at present only obtainable from opium.

Following will be found the results of an investigation of *Macleya cordata*, a papaveraceous plant previously unstudied.

Macleya cordata, R. Br. (*Bocconia cordata*, Wild.), is a native of Japan and belongs to the same sub-tribe as *Sanguinaria*, namely, Bocconieæ. It is known in Japan as a poisonous plant and grows almost everywhere upon hills and mountains, in uncultivated spots.

The hollow stem of the (perennial) herb grows to a height of more than 1 metre, the leaves are up to 30 cm. (11¾ inches) long. On puncturing the stem, veins of leaves or fruit, an orange-yellow milky juice exudes. The small flowers are arranged in a large panicle and consist of two white sepals, many hypogynous stamens and an ovary which grows to a lancet-shaped fruit of 2 cm. in length and 1½ cm. in thickness. The seeds are small and have a red colour. The root is about 5 cm. thick and on cross-section is seen to have a red colour near the periphery. It flowers in July.

The Japanese names of the plant are numerous, varying in the different provinces. The most common are: *takeni-kusa*,† *tsiampangiku* and *tachiobaku*.

An assay of the root and leaves with Mayer's solution showed that they contained about the same quantity of alkaloid (0·5–0·1 per cent.) as *Chelidonium majus*. Calculated for dry substance, the fruit appeared to contain the largest quantity of sanguinarine, the root much less and the leaves the least quantity. The other alkaloid (forming a double iodide soluble in alcohol) exists in root and leaves about in equal proportion, and is less in the fruit.

The root, of which larger quantities could be obtained, was further examined. Sanguinarine was extracted in the usual manner. The root having been exhausted with dilute sulphuric acid and alcohol, the percolate was deprived of alcohol by distillation, then supersaturated with ammonia, the precipitate—which had a dirty violet-red colour, the same as the liquid portion—filtered off after a few days, and, after drying, extracted with ether until the latter no longer acquired a yellow colour.

Gaseous hydrochloric acid was conducted through the clear ethereal solution, whereby a scarlet precipitate was produced which was washed with ether and was freed, by treatment with a little water, from an almost white sub-

* Condensed from the pamphlet: 'Beitrag zur Kenntniss der Papaveraceen-Alkaloide.' Von J. F. Eykman, Tokio. 8vo. Yokohama, 1881. Reprinted from *New Remedies*, June, 1882.

* These analyses are stated in detail by the author; but cannot be reproduced here for want of space.

† The plant is used in Japan for dyeing; *take*=bamboo; hence the name *take-ni-kusa*="bamboo-boiling-herb."

stance which remained undissolved. The orange-red solution was again mixed with ammonia, the grey-violet precipitate extracted with ether, and gaseous HCl again conducted through the liquid. These operations were repeated several times more, and finally the ethereal solutions were decolorized by animal chaacoal. In this manner a dark scarlet powder was obtained, easily soluble in water, and generally exhibiting the reactions of hydrochlorate of sanguinarine.

Mixed with a little water it melted, on the water-bath, to a dark-red syrupy liquid, which, after cooling, congealed to a crystalline mass. The dark orange-red aqueous solution yielded more or less yellow to orange coloured precipitates with most metallic salts. Ferric chloride, cupric sulphate and lead acetate, however, produced no precipitate. Tannic acid, with agitation, produced a precipitate which gradually increased, particularly on addition of hydrochloric acid.

The ethereal solutions, from which the hydrochlorate of sanguinarine had been separated by hydrochloric acid gas, were freed from ether by distillation and the residue was treated with water. This left behind a brown resin (sanguinarin-resinoid?). From the filtrate the alkaloid was precipitated with ammonia, and, after drying, extracted with ether. The portion insoluble in ether was rubbed with hydrochloric acid, and the portion still remaining insoluble, together with the residue left in previous purifications of the hydrochlorate of sanguinarine, further purified by recrystallization from water. It could not, however, be obtained in a pure state, by this method, since the solutions always assumed an intense orange colour on evaporation. The aqueous solution of this substance, which turned out to be the hydrochlorate of an alkaloid, was therefore treated with ammonia, the precipitate (in order to remove any still adhering sanguinarine) first extracted with ether and the insoluble portion afterwards boiled for some time with absolute alcohol. This removed a large proportion of the colouring matter and left most of the alkaloid behind. The latter was then again converted into the hydrochlorate by trituration with hydrochloric acid, and recrystallized from alcohol. The purest portion of the separated crystals was dissolved in boiling water, the alkaloid precipitated by ammonia, dissolved in boiling alcohol, and precipitated by addition of ether. This treatment was continued until colourless, though small, crystals were obtained. They melted at 201° C. (uncorrected) and had the properties below mentioned.

The original greyish-black powder produced by precipitating the extracts from the root with ammonia, and which had been exhausted with ether until the latter no longer acquired a yellow tint, was percolated with alcohol. The dark-brown percolate was freed from alcohol by distillation, the residue treated with acetic acid to faintly acid reaction, and then mixed with water until nothing further was separated. The filtrate was mixed with excess of solution of iodide of potassium, the voluminous precipitate (which soon shrivelled up) filtered off and washed with water. This washing produced a white precipitate in the filtrate which was separated by a new filtration. Each of these substances, viz.: the last precipitate (*A*), the brown-coloured filtrate (*B*) and the hydriodate remaining on the original filter, was separately examined. The latter was first recrystallized from water, whereby a still purer hydriodate (*D*) and a fresh mother-liquor (*C*) were obtained.

A. The white precipitate produced in the filtrate by the washings was dissolved in boiling water, the solution treated with ammonia and then shaken with ether. The separated ethereal solution, on evaporation, left an almost white residue, from which ether readily separated a soluble body. The portion remaining insoluble in ether became partially soft and assumed a red colour at 180° C. and was melted completely at 198° C.

B. The filtrate after removal of *A* was treated with ammonia, the precipitate separated from the liquid, dissolved to neutralization in acetic acid, and separated from a substance thereby remaining insoluble. The alkaloid was further purified by recrystallizing its oxalate from water and, after having again separated the alkaloid, recrystallizing it from chloroform. In this way large crystals were obtained, melting at 200·5° C. (uncorr.).

C. The mother-liquor of the recrystallized hydriodate. The base having been separated from it by excess of soda, it was filtered off, dissolved in boiling alcohol and crystallized by spontaneous evaporation. After purification and recrystallization from chloroform, the alkaloid had the melting point 201° C. (uncorr.).

D. The once recrystallized hydrochlorate was covered with solution of soda, set aside for one day, then the crystalline alkaloid (*P*) filtered off and washed. After complete purification, this was chiefly used in the further investigation of the properties, etc., of the alkaloid.

The alkaloid (*P*) separated from the hydriodate was boiled with strong alcohol to separate it from the accompanying brown substance; but the attempt was only partially successful. The alcohol was then poured off and chloroform added to the still moist crystalline mass.

As soon as the alkaloid had dissolved in the chloroform, two layers were formed, the upper (alcoholic) being quite dark and black, the lower (chloroformic) having only a light-brown tint and containing the alkaloid in solution. The lower layer was separated, and, after the chloroform had been distilled off, the residuary alkaloid converted into the acid oxalate which is readily soluble in hot water. From the solution the base was precipitated by soda and then boiled with absolute alcohol. The white portion remaining insoluble therein was dissolved in a little chloroform, precipitated by addition of ether and finally again recrystallized from chloroform.

In this way about 5 gm. of quite large, colourless, well-developed and transparent crystals were obtained. At every fractional crystallization the melting point was 200·5° to 201° C., which appears to be a satisfactory proof that the alkaloid (*macleyine*) is a pure and simple body.

Properties of the Alkaloid: *Macleyine* is almost insoluble in water and alkalies. On adding ammonia to an aqueous solution of the salt, and filtering, the filtrate separates, after a while, wart-like crystals. It is scarcely soluble in cold, a little more soluble in boiling alcohol; also very little soluble in ether, except when freshly precipitated: very little in cold benzol, more so in boiling. Chloroform, especially when warm, dissolves it tolerably well. Macleyine has no pronounced taste, but its salts have a bitter, afterwards sharp and cooling taste.

When crystallized from chloroform or ether, or precipitated by alkalies and dried by exposure to air between blotting paper, the alkaloid is obtained anhydrous. Analysis led to the formula $C_{20}H_{19}NO_5$. Macleyine exhibits a number of interesting reactions, which are detailed at length in the author's paper, but which we will have to omit for the present, for want of space. It was owing to these very reactions, however, and to the general properties of the alkaloid that the author was led to suspect its identity with one of the opium alkaloids, namely, *protopine*, the rarest of the series. Concerning protopine the author had to follow Hesse, who alone had prepared and described the substance. The agreement of the observed properties of macleyine with those described by Hesse for protopine covered the characteristic globular or warty form of the substances when separating from ether, their solubility in different menstrua, their ultimate composition, the composition of their platinum salts, and other properties of the salts. In other respects the agreement is nearly as close as in the former, though the slight differences may be owing to accidental circumstances. The author does not claim that the identity is proven, but thinks it has been rendered highly probable.

PHARMACEUTICAL NOTES.*

BY R. F. FAIRTHORNE, PH.G.

Manna as an Excipient for Pills.—Certain substances are with difficulty made into pills that will retain the spherical form. Amongst others may be named reduced iron, subnitrate and subcarbonate of bismuth, oxalate of cerium, calomel, bicarbonate of sodium, tannin, extract of logwood, Dover's powder, acetate of lead, sulphate of zinc, chlorate of potassium, phosphate of iron, ammonio-ferric alum, lactate of iron, citrate of iron and ammonium, aloes, and sulphite of sodium. After these have been made up into pills with any of the ordinary excipients of a soluble character, they almost always flatten and often unite together in a mass that is both unsightly and the cause of much inconvenience. This difficulty can be overcome by using manna and syrup in variable proportions, according to the substance operated on. The quantity of manna required is from 25 to 33 per cent. of weight of the article to be made into pills. Thus, if 100 grains of reduced iron are to be made into fifty pills, 25 grains of manna will be required, together with sufficient syrup to make a mass. The quantity of the syrup must be carefully adjusted, so as not to have more than enough to produce a mass of the proper pilular consistence. When this precaution is taken, no difficulty will be experienced in making pills which will retain their proper form. Manna possesses certain advantages over other excipients that render it of value in the instances named; one is its hardness and another its solubility. It is certainly preferable to powdered tragacanth or rice flour, which are frequently used to give consistence to the pilular mass. I would suggest the use of manna in making Vallet's mass, substituting it for both sugar and honey. The mass would be more easily handled and firmer than that as usually met with.

When manna is used in making pills with the substances named it is best to place it in the mortar first and soften it with a few drops of syrup, and add the medicinal ingredients to it.

Elixir of Blackberry.—As summer approaches, preparations of an astringent character are frequently called for, and as many of them are unpleasant to take, I offer the following receipt as one that possesses the former quality without the disadvantage of the latter:—

Take of

Fluid extract of blackberry	f℥ivss.
Syrup of blackberry fruit	f℥xv.
Jamaica spirit	f℥xij.
Curaçoa cordial,	
Cinnamon water . . . . . each	f℥iv.
Syrup of orange peel	f℥iij.
Oil of cloves,	
Oil of allspice . . . . . each	12 drops.

Mix the essential oils with the fluid extract of blackberry, add the Jamaica rum, and afterwards the other ingredients.

Elixir of Logwood is another preparation of a similar character:—

Take of

Extract of logwood	10 dr., 2 scr.
Brandy	12 fluid ounces
Curaçoa	6 fluid ounces
Syrup	6 fluid ounces
Oil of nutmeg,	
Oil of cinnamon . . each	4 drops.

Warm water sufficient to make 2 pints.

Dissolve the extract in the water, add the other ingredients, and, when cool, filter.

Glycerol of Myrrh and Borax.—This preparation commends itself for many purposes, and will be found especially serviceable as an addition to gargles and tooth-washes and as an application to sore nipples. It is made by the annexed formula:

Take of

Myrrh (in coarse powder)	1 ounce.
Powdered borax	1½ ounce.
Glycerin,	
Water . . . . . each	3 fluid ounces.

Mix the borax and myrrh together, add the other ingredients, and boil in a flask for ten minutes; strain through muslin, and add enough water to make the mixture 6 fluid ounces; when cold, filter through cotton or paper.

Solution of a considerable amount of the myrrh is effected by the borax, and the addition of glycerin enables a larger quantity of the borate of sodium to be dissolved than in water alone, producing a solution that is miscible with water without precipitation taking place.

This makes an elegant *lotion* for application to the gums, or as a *mouth-wash* when diluted with decoction of quillaia bark and flavoured with oil of rose or other essential oil.

The following is a very satisfactory formula:—

Take of

Glycerol of myrrh and borax	f℥ij.
Decoction of quillaia (2 ozs. to Oj)	f℥iv.
Oil of rose	4 drops.
Oil of cloves	6 drops.
Oil of orange peel	6 drops.

Mix and filter.

A Good Black Ink can be made with the following ingredients:—

℞ Galls (in moderately fine powder)	2 pounds avd.
Copperas	10½ ounces.
Gum arabic	10 ounces.
Sugar	½ ounce.

Water sufficient to make 18 pints.

Place the galls in an enamelled vessel, pour on it 6 pints boiling water, and allow it to macerate two days; transfer to a glass percolator, in the neck of which is a piece of absorbent cotton, through which allow the liquid portion to drain. When this is accomplished, pack the galls firmly and displace with sufficient water to produce two gallons with that portion of the infusion which first passed. Then dissolve the gum and sugar in 2 pints of water; add this and the copperas to the infusion of galls. This, after standing about twelve days, will produce a very superior ink. About 8 drops of wood creasote should be added to prevent moulding

* From the *American Journal of Pharmacy*, June, 1882.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 70.)

POTASSII SULPHOVINAS (*Sulphovinate of Potassium*). [Æthylsulphate of potassium. Kali sulphovinicum. Sulphas æthylico-kalicus.]

Sulphuric acid	1
Absolute alcohol	1
Distilled water	4
Carbonate of barium	q.s.
Carbonate of potassium	q.s.

Mix the sulphuric acid and absolute alcohol gradually, and taking care that the temperature does not rise above 50° C. (122° F.). Let the mixture stand for four days at a temperature of 20°–25° C. (68°–77° F.), then dilute it with the distilled water, and add to it a sufficient quantity of carbonate of barium to render the mixture neutral. Filter the liquid, and add to it, under the application of a very gentle heat, enough carbonate of potassium to render the reaction faintly alkaline. Filter the liquid from the precipitated carbonate of barium, and evaporate the filtrate, at a temperature not exceeding 80° C. (176° F.) to the point of crystallization.

* From *New Remedies*, April, 1882.

Clear crystals, easily soluble in water, deliquescent on exposure to air, decomposing at 120° C. into alcohol and acid sulphate of potassium, and yielding acetic ether when heated with anhydrous acetate of potassium.

The aqueous solution of the salt should not be rendered turbid by sulphuric acid, and should be rendered not more than faintly opalescent by solution of barium chloride.

CUPRI SULPHAS IN BACILLIS (*Sulphate of Copper in Sticks*).

Heat crystallized sulphate of copper until it has become completely anhydrous, and rub the dry salt to a fine powder. Press or ram the powder into small cylindrical moulds made of filtering paper, about 8 cm. (3¼ inches) long, and 7 mm. (about ¼ inch) in diameter, and after having closed them, put them for one or two days in a damp place. Finally remove the casing of filtering paper.

FERRI TERSULPHAS (*Tersulphate of Iron*) (*dry*).
[Ferric Sulphate.]

Sulphate of iron (ferrous)	256
Distilled water	256
Sulphuric acid	47
Nitric acid . . . . sufficient, or about	67

Dissolve the sulphate of iron in the distilled water, heat the solution, and add to it the sulphuric acid. Then gradually drop into it nitric acid as long as nitrous vapours are given off [or until a drop of the liquid, diluted with water, ceases to give a blue precipitate with ferricyanide of potassium].

Evaporate the clear solution on a water-bath to dryness.

The product is a white powder difficultly soluble in water.

SYRUPUS FERRI BROMIDI (*Syrup of Bromide of Iron*).

Iron, in powder	1
Bromine	2
Sugar	15
Distilled water	q.s.

Put the iron into a flask, pour upon it 10 parts of distilled water, and add to it the bromine in small quantities at a time, and under constant agitation. Filter the light-green liquid into a flask containing the sugar, and wash the filter with sufficient distilled water to make the contents of the flask weigh 27 parts. Finally dissolve the sugar by agitation, and preserve it in small well-closed vials.

The syrup has a light green colour, and contains 10 per cent. of ferrous bromide.

SYRUPUS CODEINÆ (*Syrup of Codeine*).

Codeine	1
Alcohol	5
Syrup	494
	500

Dissolve the codeine in the alcohol and add the syrup.

SYRUPUS DEPURATIVUS (Larrey) (*Larrey's "Purifying Syrup"*).

Sarsaparilla, cut and bruised	200
Guaiac wood, rasped	50
China root (*Smilax China*), in coarse powder	5
Sassafras, rasped	5
Senna	6
Borage (*Borago officinalis*)	6
Elder juice (inspissated)	40
Molasses	500
Sugar	500
Water	q. s.

Boil the sarsaparilla, guaiac wood, and China root for half an hour with enough water so that 720 parts of liquid may be separated from the dregs. Add to this liquid the sassafras, senna, and borage; let it macerate for half an hour, and strain. Then mix the strained liquid, which should amount to 700 parts, with the other gredients.

SYRUPUS EUCALYPTI (*Syrup of Eucalyptus*).

Eucalyptus leaves	5
Sugar	20
Water	q.s.

Pour 50 parts of boiling water upon the eucalyptus, let it macerate for one hour, then strain and express.

For every 12 parts of liquid so obtained, add 20 parts of sugar, and dissolve.

SYRUPUS FUCI VESICULOSI (*Syrup of Seawrack*).

Extract of seawrack	1
Water	1
Syrup	7

Dissolve the extract in the water and add the syrup.

The extract is prepared as follows:—

EXTRACTUM FUCI VESICULOSI (*Extract of Seawrack*).

Seawrack, dried and in coarse powder	1
Alcohol (stronger)	3
Water	q.s.

Macerate the seawrack with 2 parts of alcohol and 3 parts of water during three days, occasionally agitating. Express and treat the residue again, during one day, in the same manner, with 1 part of alcohol and 2 parts of water. Again express, unite and filter the liquids and evaporate them, on a water-bath, to a dry extract.

Preserve it in a well-stopped bottle.

EXTRACTUM FULIGINIS (*Extract of Soot*).

Soot, obtained by the burning of wood or peat	1
Boiling water	2
Alcohol	2

Mix the soot with the boiling water, let it stand for one day, occasionally stirring, express, and filter the liquid. Treat the residue in the same manner with the alcohol. Unite the liquids and evaporate them, on the water-bath, to a dry extract.

SYRUPUS CHLORAL[1] (*Syrup of Chloral*).

Chloral hydrate	16
Distilled water	24
Syrup	200
Oil of curled mint	0·1

Dissolve the chloral in the distilled water, add the solution to the syrup, and finally add the oil.

[If the parts are taken in *grams*, 1 *drop* of the oil is sufficient. Oil of peppermint will answer equally well.]

SYRUPUS FERRI HYPOPHOSPHITIS (*Syrup of Hypophosphite of Iron*).
(Syrup of Ferrous Hypophosphite.]

Hypophosphite of calcium	30
Sulphate of iron (ferrous)	47
Sugar	600
Distilled water	q.s.

Dissolve the hypophosphite in 300 parts of distilled water and the sulphate of iron in 100 parts of distilled water. Mix the two solutions, let the mixture stand for one hour, occasionally stirring, then filter.

To every 370 parts of the filtrate add 600 parts of sugar and dissolve.

Keep the syrup in a cool place.

SYRUPUS CALCII IODIDI (*Syrup of Iodide of Calcium*).

Lime	5
Iodine	2
Sugar	200
Water	q.s.

Triturate the lime to a fine powder with the sugar and gradually add 100 parts of water. Let the mixture stand for several hours, occasionally stirring, then filter.

To the filtered liquid add the iodine, and when this is dissolved, 170 parts of sugar. Dissolve the latter without heat.

The syrup is clear and colourless and should be preserved in a well-stoppered bottle.

SYRUPUS JUGLANDIS (*Syrup of Butternut Leaves*).

Extract of butternut leaves	1
Syrup	60

Dissolve the extract in the syrup.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JULY 29, 1882.

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

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CHEMISTRY IN RELATION TO THE INDUSTRIAL ARTS.

IN almost every department of science the work that has been done by natives of Great Britain will bear comparison with that which has been done elsewhere, and though science itself is of no particular country, it is from a national point of view satisfactory to reflect that the names of some of our countrymen rank among the foremost of those who are historically celebrated for discoveries and for researches by which our knowledge of nature has been extended. But while there is on this score reason for congratulation, there is also a very important circumstance of difference between this country and many others in regard to science wherein we compare very unfavourably with them. It has been too much the habit to look upon science as having to do with something that is, if not unreal, at least outside the range of ordinary practical experience; science has been cultivated too much from an abstract point of view and without sufficient general recognition of the fact that it is of direct practical concern in every-day operations, inasmuch as its subject matter is the same as that with which all such operations have to do. Especially has this been the case with chemistry, which has been commonly looked upon as a species of parlour magic, suited for the entertainment of *dilettanti* rather than as the light by which industrial art is to be guided in order to ensure success and improvement. With that love of a formula which characterizes the Britisher as much as his love of a lord, it has been customary to act upon the assumption that science has little or nothing to do with the practical operations by which various materials are made to yield products necessary for our daily wants, or with the conduct of industrial processes by which some of those materials are adapted for useful purposes. This erroneous belief in the absence of any useful relation between science and practice is, however, dying out, and though we have not yet advanced so far as our continental neighbours in making science of advantage by combining it with practice, it is at least satisfactory to observe that some progress is being made in this direction.

One of the most recent illustrations of this progress is afforded by the formation of a Society of Chemical Industry, the main object of which is to promote that attention to chemical science which is indispensable for the successful conduct of the various branches of industry that are dependent upon the utilization of chemical action. For this purpose it is proposed to associate together persons interested in such industries or possessing a knowledge of the chemical principles concerned with them, so as to afford opportunity for the interchange of ideas and information by which important branches of national industry might be improved. This Society has now been in existence but little more than a year, and the number of its members has been increased to 1250, including representatives of manufacturing firms all over the country. Its first annual meeting has just been held at Manchester and the President, Professor ROSCOE, opened the proceedings by delivering an address in which he referred to the rapid increase in the number of members as furnishing a proof that the establishment of such a society was necessary. On the support thus afforded it has been possible to undertake the publication of a journal, of which several numbers have appeared already. It is intended to make this journal a complete epitome of the progress of chemical industries throughout the world by giving accounts of the newest discoveries and patented inventions in various branches of applied chemistry and to uphold the principle that in manufacturing operations a healthy practice can only exist when based on a sound knowledge of theory.

It is with much pleasure that we refer to this bold and uncompromising attack upon the position of the "practical men" who have been in the habit of repudiating any dependence upon theory, and we trust that it may prove the first step towards the recognition of the principle that manufacturers must be educated up to the level of the science of the day—able to understand and apply the discoveries of the purely scientific chemist, which constitute the foundation of their trade. The illustration given by Professor ROSCOE of the beneficial effects resulting from the adoption of the principle in the case of the German and Swiss colour makers is a very striking one, for it shows that even local advantages and the possession of abundant sources of raw material fail to be of practical account when industrial operations are managed, as they unfortunately have been to great extent hitherto in this country, by persons ignorant of the scientific principles involved in them. It is in consequence of this difference between our relation to science as an industrial agent and that obtaining on the Continent that we lose the profit of an industry producing annually upwards of three millions sterling, which, on account of our production of greater part of the raw material required should properly be ours. Unless this difference be done away with by timely attention to the neces-

sities of the case, and by the establishment of schools suitable for the highest and most complete scientific training of intending manufacturers, the consequences of the deficiency on our part will infallibly make itself felt in other branches of industry to our disadvantage.

THE REGULATION OF PHARMACY IN NEW ZEALAND.

A MEETING of the Pharmacy Board of New Zealand was held last month at Christchurch, at which the President, Mr. BARRAUD, of Wellington, stated that up to the present time there had been 234 chemists and druggists registered under the Pharmacy Act of New Zealand, a draft of which was published in the Journal for 13th November, 1880. It was also mentioned that the Board proposed to hold examinations simultaneously at Auckland, Wellington, Christchurch and Dunedin, the first of which were to take place in the first week of this month. As soon as these examinations were established it was intended to institute proceedings against all unregistered chemists carrying on business. According to a resolution of the Board it was determined that the Modified examination of the British Pharmaceutical Society should be adopted for the present standard, but that a higher standard, the syllabus of which was arranged, should come into operation wholly or in part in January, 1884. It was agreed to communicate with the Pharmacy Board of Victoria, New South Wales, Queensland and Tasmania, with a view to ascertain the standard of efficiency necessary to ensure mutual recognition of certificates. A series of text books for the use of students in pharmacy was approved, and it was ordered that the conspectus of education required by the Board should be printed and circulated through the local Registrars and that every facility should be given for placing pharmaceutical education on an efficient and permanent footing.

A copy of the regulations for the examination of candidates for registration as pharmaceutical chemists has been forwarded to us by Mr. J. A. ALLAN, the Secretary and Registrar, according to which the Modified examination is to include Prescriptions, Practical Dispensing, Materia Medica, Quality of Specimens, Pharmacy, and Chemistry of the Pharmacopœia.

Division I.—Prescriptions.—The candidate must be able to read autograph prescriptions, translate them into English, render a correct translation of the directions for use, and detect unusual doses.

Practical Dispensing.—The candidate must be able to weigh, measure, compound medicines, write the directions neatly in suitable language, and to finish and direct each package properly.

Division II.—Materia Medica.—The candidate must be able to recognize the Pharmacopœia chemicals in frequent demand, and specimens of roots, barks, leaves, fruits, resins, and gums in ordinary use; the following plants, either in a fresh or dried state, or from plates:—Belladonna, stramonium, hyoscyamus, conium, aconitum, digitalis, and sabina; also, to correctly estimate the quality of each specimen submitted.

Division III.—Pharmacy.—Every candidate must be able to recognize the preparations of the Pharmacopœia which are not of a definite chemical ature, such as extracts, tinctures, and powders, and give the proportion of the more active ingredients.

The proposed syllabus of study for examination before examiners appointed by the Pharmacy Board coming into existence in January, 1884, comprises, in addition to what is above specified as to prescriptions and practical dispensing, under the head of pharmacy, a practical knowledge of the processes, and the principles of the processes, by which the preparations of the Pharmacopœia are made, and of the best excipients and methods of manipulation for forming emulsions, pills, etc.; under materia medica the recognition of specimens of roots, barks, leaves, fruits, resins, gums, animal substances, etc., used in medicine, the botanical and zoological names of the plants, etc., yielding them, and the natural families to which they belong, the countries and sources from which they are obtained, and the official preparations into which they enter, judging the quality and freedom from adulteration or otherwise of the specimens, and describing the methods of obtaining their active proximate constituents in a separate state.

Botany is to comprise an acquaintance with the parts of the flower, fruit and seed. The candidate must be able to distinguish practically between each of the following natural orders:—Ranunculaceæ, papaveraceæ, malvaceæ, leguminosæ, rosaceæ, cucurbitaceæ, umbelliferæ, compositæ, gentianaceæ, convolvulaceæ, solanaceæ, atropaceæ, polygonaceæ, orchidaceæ, iridaceæ, liliaceæ, graminaceæ, and refer to their respective orders such specimens as may be shown to him.

Chemistry is to comprehend a practical knowledge of the nature and properties of the elements and their compounds, especially those used in medicine or the arts. The different combinations and decompositions must be explained by equations; also the qualitative analysis of the more important chemicals, *e.g.*, nitrates, chlorides, carbonates, sulphates, phosphates, oxalates, tartrates, etc., and the detection of impurities in them, and the volumetric estimation of the strength of all Pharmacopœia preparations in which standard solutions are ordered to be used.

We may therefore infer that the provisions of the New Zealand Pharmacy Act are being carried out, so far as circumstances admit, and the resolutions adopted by the Board afford some guarantee that the future pharmacist of that colony shall possess at all events a good education and be thoroughly efficient in his business.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 12, 13, 14, 19, 20 and 21, 1882.

Present on each day—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

Dr. Greenhow attended on the 13th, 14th and 19th, on behalf of the Privy Council.

July 12.

MAJOR EXAMINATION.

Seven candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Caldecott, Clement Guest .. ...Whitchurch.
Dowdeswell, Jonathan.....Tiverton.
Holmes, Francis .....Lutterworth.

MINOR EXAMINATION.

Twenty candidates were examined. *Fifteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Samuel .....Worcester.
Bowering, John .....Taunton.
Cave, Herbert William .....Wisbeach.
Evans, John Robert.....Carnarvon.
Nichol, Anthony .....Carlisle.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

July 13.

MAJOR EXAMINATION.

Seven candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bain, John.....Bridge of Allan.
Drew, Walter Clark.....London.
Yeatman, Frederick James.....London.

MINOR EXAMINATION.

Twenty candidates were examined. *Fourteen* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Comer, Ernest Edward .....East Dereham.
Cullwick, Herbert Ernest .....Knighton.
Daniel, George .....Holsworthy.
Dillon, Charles Linder.....Hereford.
Eley, Herbert .....Derby.
Foggitt, John Blackett .....Thirsk.

July 14.

MINOR EXAMINATION.

Twenty-six candidates were examined. *Thirteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, William.....Cardigan.
Frost, John Henry .....London.
Gaskin, John Henry.....Wolverhampton.
Greenall, Thomas Holdsworth...Ashton.
Hall, Amos .....Stafford.
Hankinson, George Robert.....Grange-over-Sands.
Hanson, Christopher .....Buckhurst Hill.
Harston, Charles Edward .....Lincoln.
Hewlett, Thomas Charles .....Bedford.
Hickson, Robert William .....Hull.
Hodgson, Thomas Samuel .....Manchester.
Hornby, William Thomas .....Stockport.
Innes, David.....Stalybridge.

July 19.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Murray, George .....Coldstream.
Wheatley, Joseph.....Huddersfield.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Thirteen* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Loam, James Gilbert .....Liverpool.
Longtoft, William .....Bedale.
Mann, Joseph .....Peterborough.
Meadows, John Martin .....Swindon.
Miller, Wm. Philip Faulkner...Folkestone.
Mitten, Flora .....Hurstpierpoint.
Noble, Henry Edward.....Peterborough.
Thomas, Joseph Arden ..... Cambridge.

July 20.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Eleven* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Norburn, Albert Edward .....London.
Northen, Charles .....Thorpe-by-Water.
Parker, Thomas Herbert .....Bedford.
Pearson, William .....Sinderland Green.
Pellew, Albert .....Woodbridge.
Pickering, Wade .....Crowle.
Pinder, Robert .....Bourne.
Ransom, Francis .....Hitchin.
Rodmell, John Gale.....Rochester.
Rowland, Thomas William.....Epping.
Sergent, William Thomas .....Croydon.

July 21.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Eleven* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Shapcott, William Henry Pyne..London.
Thisleton, Hugh .....Preston.
Thomas, William Hendy .....Penryn.
Townsend, Henry Holden .....London.
Tyson, Thomas Balmforth .....London.
Warburton, Edward .....Farnworth.
Waymouth, Thomas Staddon...Exeter.
Weddle, William .....Gateshead.
Wellburn, John Samuel .....Scarborough.
Wells, William George .....Maidstone.
Wheeley, John Thomas Martin.London.
Williams, William Jesse .....Crickhowell.
Wood, John Ridal .....Rotherham.
Worts, Harry Augustine.....Harwich.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Dennis, Frederick Woodrow ...Louth.
Gratton, George Edwin .....Conway.

Certificate of the University of Aberdeen.

Kettle, George James .....Aberdeen.

Certificate of the University of Cambridge.

Atterbury, Clive .....Burton-on-Trent.

EXAMINATIONS IN EDINBURGH.

July 20 *and* 21, 1882.

Present—Messrs. Ainslie, Baildon, Clark, Gibson, Gilmour, Kinninmont, Nesbit and Stephenson.

Professor Maclagan attended on the 20th on behalf of the Privy Council.

July 20.

MAJOR EXAMINATION.

Two candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Kinross, William Malloch .....Edinburgh.

MINOR EXAMINATION.

Thirteen candidates were examined. *One* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Adamson, William Stewart ...Edinburgh.
Bell, Charles Russel.....London.
Bell, John Henry.....Epworth.
Berry, Andrew Wales.....Aberdeen.
Bostock, Samuel Pass .....Hyde.
Dugan, Alexander Ferrier .....Aberdeen.
Gatward, Oswald .....Hitchin.
Haddon, John .....Birmingham.
Hogg, Henry Scott .....Glasgow.
Jackson, William Moses.....Ayr.
Jamieson, Simpson .....St. Andrews.
Jones, John Wesley.....Llanelly.

July 21.

MINOR EXAMINATION.

Fourteen candidates were examined. *Seven* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Mackay, William.....Edinburgh.
McRither, Alexander Buchan...Dundee.
Miller, George .....Arbroath.
Schofield, John William .....Morpeth.
Skirving, Alexander.....Glasgow.
Sutherland, Adam Gordon .....Edinburgh.
Sutherland, John William .....Edinburgh.

MODIFIED EXAMINATION.

The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Gill, Richard Turton .....Pocklington.

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

Thursday, July 20, 1882.

Present.—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Sir George B. Owens, M.D., Drs. Collins, Montgomery, and Whitaker (Belfast); Messrs. Allen, Brunker, Grindley, Hayes, Payne (Belfast), Pring (Belfast), Simpson.

A letter was read from William Whitla, M.D., of Belfast, resigning his seat on the Council.

The President stated that Dr. Whitla was a candidate for the Examinership in Pharmacy, which was his reason for ceasing to be a member of the Council.

Dr. Whitla's resignation was accepted, on the motion of Dr. Collins, seconded by Mr. Payne.

Mr. William F. Wells, jun., of 20, Upper Baggott Street, Dublin, was proposed by Mr. Pring, and seconded by Mr. Hayes, to fill the vacancy.

Mr. William Harrington, of Cork, was proposed by Sir George Owens, and seconded by Dr. Collins.

A division resulted in the election of Mr. Wells.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

The first annual meeting of the Society of Chemical Industry was opened on Wednesday, July 5, at Owens College. The members assembled in the Chemical Theatre, and the chair was taken by Professor Roscoe, President of the Society.

There was a large attendance of members

The President's Address.

The President, after welcoming the members to Manchester, said: "On June 28 of last year, at the first meeting, in London, the number of members on the Society's books was 297; I am now able to announce that the number on the rolls is 1250, consisting of gentlemen connected with the most widely different departments of industrial chemistry resident throughout the United Kingdom, and including many distinguished names of English and continental scientific chemists. I have to congratulate the Society on the unprecedentedly rapid and most satisfactory progress it has made, sufficiently proving—if any proof were required—the truth of the opinion which I expressed last year of the necessity for the establishment of a society of the kind, which should include all those interested or possessing knowledge concerning the utilization of chemical action on a large scale, and having charge of, or connected with, those branches of industry dependent on chemical principles. During last autumn two sections of the Society have been founded—one a metropolitan section, under the chairmanship of Professor Abel, C.B., F.R.S., and the other established under the direction of Mr. Edmund K. Muspratt. A variety of papers on subjects interesting both from a manufacturing and theoretical point of view were read at those sectional meetings by various members of the Society, and discussions which have proved of practical utility have taken place. The Council of the Society also appointed last year a Committee on the Patent Laws. This Committee has held several meetings, and has taken active steps in view of the approaching legislation on this important question. The Committee wil lay a separate report of its action before the Society. The feature, however, of the greatest importance in connection with the Society is the adoption of the suggestion made by the Council at the first general meeting respecting the publication of a journal. The first number of it appeared in January of the present year. The Publication Committee appointed by the Council to superintend the issue of the journal was fortunate in securing the services of Mr. Watson Smith, of Owens College, to act as editor, and were able to arrange for printing and publishing by Mr. Emmott, of Manchester. The results have proved highly satisfactory, the journal supplying a want which has long been felt in English chemical industries. The Publication Committee have endeavoured to secure not only satisfactory reports of the papers which have been read and the discussions which have taken place at the sectional meetings, but have striven to make the journal a complete epitome of the progress of chemical industries throughout the world. For this purpose they have engaged a number of qualified abstractors, to whom they are indebted for the able accounts of the newest discoveries and patented inventions in the various branches of applied chemistry. It is the intention of the Publication Committee to spare no pains to make the journal of the Society the most complete and reliable one of its kind in existence. Above all the Committee has determined to uphold and retain the scientific status of the journal, convinced that a healthy practice can only exist when based on a sound knowledge of theory. In this respect the *Journal of the Society of Chemical Industry* will differ from many so-called technical journals, inasmuch as we shall have

frequently to treat of the highest and most complicated problems of chemical science, just because it is these which serve as the starting point for some of the most important industrial applications. Thus conducted, I think our journal cannot fail to exert a beneficial influence on many branches of English chemical industry which have unfortunately hitherto been managed to a great extent by persons ignorant of the scientific principles involved in the processes which they carry on. In my address last year I drew attention to the fact that although the greater part of the raw material used in the manufacture of the coal-tar colours is produced in this country, we imported from Germany and Switzerland by far the largest quantity of the manufactured colours, and thus we lose the profit of an industry of the value of above three millions sterling, which should properly be ours. Many reasons no doubt have contributed to this result. Patent laws may act injuriously upon our inventors, and other grounds may be assigned, but in my opinion the chief superiority which the German and Swiss undoubtedly possess over the English colour makers is to be sought in the thorough appreciation on the part of the foreigners of the value of, and necessity for, scientific training and knowledge of the highest type in the conduct of their business. The German and Swiss colour maker is not content to manufacture a series of well-known products; he must constantly bring out novelties, and for this purpose he and his chemist must be educated up to the level of the science of the day. He must be able to understand and apply the discoveries of the purely scientific chemist, for these form the foundation of their trade. The necessity for this was long ago proclaimed by Liebig, who said, 'It has taken a long time to convince technical men of the fact that they are bound to acquire for themselves the highest possible scientific education if they wish properly to understand their processes, and if they desire to start new manufactures and to meet the ever-increasing demand for novelties.' I have recently had an opportunity of visiting some of the continental coal-tar colour works, and I think I cannot better enforce this argument than by giving a sketch of one of these, with the kind permission of the proprietors. The one I choose as an example is neither the chief nor the most famous of these works. It is a new and comparatively small one, erected on the banks of the Rhine at Basle, by Messrs. Binscheidler and Busch. These works, though far less extensive than those of Messrs. Meister, Lucius and Co. at Hoechst, or the Badische Aniline and Soda Works at Ludwigshafen, are carried on in a no less scientific spirit. As I have already stated, the first principle that governs continental colour works is the absolute necessity of having highly-trained scientific chemists, not only at the head of the works, but at the head of every department of the works where a special manufacture is being carried on. In this respect this method of working stands in absolute contrast to that too often adopted in chemical works in our own country, where the control of the processes is left in the hands of men whose only rule is that of the thumb, and whose only knowledge is that bequeathed them by their fathers. On entering the works of Messrs. Binscheidler and Busch—and I have to thank the former gentleman for his kindness in affording me information and for giving me leave to make it public—one is struck in the first place with the adaptation of means to ends, with the spacious, well-lighted, well-ventillated workshops, and above all with the all-pervading cleanliness and neatness. But it is not of these things I now desire to speak, but rather of the method in which their business is conducted. In the first place, then, the scientific director is a thoroughly educated chemist, cognizant of and able to make use of the discoveries emanating from the various scientific laboratories of the world, and under him are three scientific chemists, to each of whom is intrusted one of the three departments into which the works are divided. Each of these head chemists, who has in this instance enjoyed a thorough training at the Zurich Polytechnicon, has several assistant masters placed under him, and all these are gentlemen who have had a theoretical education in a German university, or in a polytechnic school. An important part of the system is now to be noticed, namely, that directly under these scientific assistants come the common workmen, who have of course no knowledge whatever of scientific principles, and who are in fact simply machines acting under the will of a superior intelligence. The many and great advantages of this arrangement are patent to all, and the fact of having men of education and refinement in positions of the kind renders the foreign manufacturer who adopts this system less liable to annoyance and loss than his English competitor who works on a different plan. So much then for the *personnel* of the works. Now for the means with which they carry on their work. To begin at the beginning, we find no less than ten well-equipped airy experimental laboratories, perfectly distinct from the workshops where the manufacturing processes are carried on. In these ten laboratories the chief departmental chemists and their assistants carry on their investigations respecting the production of new colouring matters or the more economical manufacture of old ones. To assist them in this work a complete scientific library is at hand, consisting of the newest researches, for these, as I have said, form the material out of which the colour chemist builds up his manufacture; and no sooner, perhaps, do the results of a purely scientific research appear which may possibly yield practical issues than the works' chemist seizes upon them, repeats them with modifications and alterations, so as at last to bring them within the charmed circle of financial success. Thanks to Dr. Binscheidler, I am able to quote a specially representative case, and a clear description of one such case is worth a host of generalities. Through the original investigations of the Messrs. Fischer the attention of the manufacturer was drawn to a colourless base obtained by the action of benzaldehyde on dimethylaniline, inasmuch as they stated that the salts of these colourless bases became green on exposure to air. Founded on these observations, an endeavour was made to effect the practical manufacture of a green colouring matter by oxidization of these colourless bodies. In order to attain the desired end the following investigations had to be made by the chemist and his assistants who were to conduct the operations. First, a cheap method had to be found for manufacturing benzaldehyde (commonly known as the oil of bitter almonds). Secondly, a profitable mode of making the colourless bases had to be worked out. Thirdly, the proper oxidizing agents and their best method of application had to be determined. Fourthly, the best method of purifying and crystallizing the green colouring matter had to be discovered. The laboratory experiments on the above points having proved so far successful as to give prospect of good results, operations on a somewhat larger scale were started, and these yielding a satisfactory issue, the manufacture of the colouring matter, now so well known as malachite green, was commenced on the technical scale, the operations still being watched and constantly under the control of the chemist. But even now their scientific work was by no means ended. Continual laboratory experiments go on for the purpose of finding improvements in the mode of manufacture. Thus, for example, the improved yield, both as to quality and quantity, of the benzaldehyde is a matter of investigation. Again, the synthetic production of pure colourless bases by a more direct process is sought for, so as to get rid of loss in working, and to obtain a yield as close as possible to that pointed out by theory. In the same way improvements in the materials used for oxidation and in their

application are made, so as to effect the oxidation quantitatively without the forms of by-products. Lastly the action of various solvents is examined so as to obtain the best form of the crystallized colouring matter. As indicating the value of these improvements, made after the colour became a marketable article, it is only necessary to state that the price of crystallized oxalate has been reduced from £2 to £1 4*s.* per kilo. The foregoing may serve to give a picture of a really scientifically constructed work, where each step in advance is made systematically as the result of a well-devised plan of operations. This is indeed the only means of progress, and this fact is so well recognized in Germany that each of the larger colour works at Hoechst and Ludwigshafen possesses a staff of from thirty to forty well paid, thoroughly trained chemists to conduct its operations. But I am, of course, far from believing that because the methods adopted in these foreign colour works are scientific and productive of good, those made use of in all English works must therefore be unscientific and bad. Taking the whole applications of chemical science I think we may with truth say that the English industrial chemists have been at least as successful commercially, and certainly as productive, in new and important discoveries as their continental rivals. The Germans and Swiss, however, have been and still are distinctly before us, not only in the means of obtaining the highest technical training in their numerous universities and polytechnic schools, but, what is more to the point, before us in the general recognition of the value and importance of such training for the successful prosecution of any branch of applied science. However, though England is apt to be late in taking up such views, she is, as Mr. Forster has well said, generally not too late, and the recent establishment of colleges and technical schools, as well as the appointment of the Royal Commission on technical instruction, on which I have the honour to serve, show that the country is now alive to the necessities of the case; and my object in the foregoing remarks has been to show that in certain branches at least of chemical industry it is only the highest and most complete scientific training that can ensure commercial success. Such a training, I may perhaps be allowed to add, can now be obtained in our own country."

Mr. Ludwig Mond, foreign secretary, read a report of the Patent Laws Committee. After full discussion the majority of the Committee had come to an agreement in the main with the bill elaborated by the Society of Arts, and brought in by Sir John Lubbock. They differed from the bill, however, on a few points, which the Committee considered of sufficient importance to lay before Mr. Chamberlain, who had undertaken to bring in a bill on the part of the Government. Mr. Chamberlain replied that it was quite uncertain when the Government bill for amending the patent laws would be introduced. He would be glad, however, if the Society would communicate with him as soon as the bill was introduced.—The Committee was re-appointed.

Mr. A. K. Huntington, Professor of Metallurgy, King's College, London, read a paper on "The Mexican Amalgamation Process." He gave the results of about forty experiments in which was shown the action of mercury on sulphide of silver, and on proustile in water in a solution of common salt, and in a solution containing sulphate of copper and common salt. The commonly accepted explanation of the action of cupric chloride on sulphide of silver in the Mexican amalgamation process was shown to be only to a limited extent correct. Other points in this process were also elucidated. Professor Huntington also read a paper on "The Metallurgy of Cobalt and Nickel." He sketched the present state of our knowledge of the metallurgy of these metals, with special reference to rendering them malleable. A fine collection of specimens was exhibited.

Mr. Watson Smith read a paper prepared by Dr. Otto N. Witt (who was unable to be present) on "The Application of Indophenol Blue to Calico Printing and Dyeing."

Mr. Charles O'Neill read a paper on "The part of Chemistry in Calico Printing." He sketched the past relations of chemistry with printing and dyeing, pointing out that in 1409, there were print works in London using colours composed of nearly the same ingredients as were in general use within the last ten years. Although calico printing and dyeing might be considered a chemical business, many houses of the second class managed to get on without any skilled chemist or even a laboratory in which experiments could be made or materials tested. This want of chemical knowledge was a source of considerable loss. It was impossible in such circumstances to determine whether or not materials supplied were genuine, and goods were often damaged in consequence. The impossibility of controlling the supply of drugs and other materials from lack of acquaintance with them often left employers in the hands of dishonest servants. He had much hope for the future of our calico printing. Employers and managers were becoming more educated in chemical matters, and better able to appreciate the services chemistry can render.

The President agreed with Mr. O'Neill as to the importance and necessity of scientific chemical training in the carrying out of the work of the calico printer. He had no doubt the fact of the Society meeting in Manchester, and this expression of opinion, would not be without influence. As to the work the Royal Commission on technical education had to do, his lips were of course to some extent sealed. But the attention of the Commission had been drawn to this subject—and no one had done more in this way than Mr. O'Neill—and it was the intention of the Commission to give full weight to what had been laid before them. Professor Roscoe, in concluding, asked Mr. O'Neill for his opinion in regard to some calico prints sent in for exhibition by Manchester firms, and some manufactured by M. Thierry-Mieg, of Alsace.

Mr. O'Neill said the examples of printing from Alsace were certainly very fine, and while he would wish to hold up the printing of this country if he could, it must be admitted that the foreign goods were something better than any of the others in the room. It was, of course, to be taken into account that the British prints were sold at cheaper rates, but home manufacturers had something to learn yet before they could produce the quality shown in the prints from Alsace.

In the evening the members of the Society dined together in one of the large rooms at Belle Vue Gardens. Professor Roscoe presided, and there were about one hundred and twenty gentlemen present.

On Thursday, the annual meeting was resumed at Owens College, the President, Prof. Roscoe, in the chair.

Mr. M. A. Chance (Birmingham), read a paper on Shaffner and Helbig's sulphur recovery process,* as to which he said the interest had extended far and wide since public attention was attracted to it in January last. The process would necessarily affect very materially importers and consumers of sulphur, and several of the leading alkali makers in England were already so convinced of its value as to be taking steps to adopt it. The pressing question of the hour was to determine the best form of plant and the best mode of manipulation to turn the reactions to the best account. Mr. Chance proceeded to describe the plant he is erecting to work the process on a scale of dealing with 300 tons of salt cake per week. This year, he concluded, would be memorable in the alkali trade as having witnessed the introduction of this beautiful process into England, a process replete with problems full of interest to chemist and engineer alike.

* See *Pharm. Journ.* [3], xii., 969.

Some discussion followed, in the course of which much admiration was expressed of the process and hope as to its ultimate success. Only Mr. Ludwig Mond was of opinion that the value of the process had yet to be shown.

On the motion of Mr. John Williams, seconded by Mr. Newlands, the office-bearers of the Society were reappointed, the only change being the substitution, in the president's chair, of Professor Abel for Professor Roscoe.

Professor Abel, in accepting office, said he was sorry the Council had not been able to persuade Dr. Roscoe to continue President for another year. To him the success of the Society was largely due, and for his indefatigable labours he moved that Dr. Roscoe be awarded a hearty vote of thanks.

The motion, which was seconded by Mr. Muspratt, Liverpool, was heartily passed.

It was resolved that the meetings of the Society next year be held in London.

In the afternoon the members visited a number of works in the city and the neighbourhood.

A Conversazione was held in the evening at the College, and largely attended by members of the Society and ladies and gentlemen invited by the Council. The guests were received by Professor Roscoe, the President of the Society. The whole of the College was thrown open, and there were a number of interesting exhibitions and entertainments of various kinds.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, July 19, at 4.0 p.m.

Present—Professor Attfield, President, in the chair; Messrs. Benger, Brady, F.R.S., Ekin, Plowman, Southall, Squire, Taylor, Dr. Thresh, and Messrs. Benger and Carteighe (Honorary Secretaries).

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Mr. Chipperfield, Mr. Payne, Professor Tichborne and Mr. Young.

It was reported that in addition to the papers previously announced, the following gentlemen had offered contributions:—Messrs. Bothamley, Brownen, Dunstan, Fletcher, Gerard, Giles, Greenish, Holmes, Hooper, Jackson, Naylor, Proctor, Shenstone, Symes, Woodland and Professor Tichborne.

A letter was read from Mr. Gerrard stating that he would be unable to complete the investigation he had undertaken on *Atropa Belladonna* in time for the Southampton meeting. It was decided that he should be invited to report the result of his work up to the present time.

A letter from Mr. Carteighe stating that it was necessary for him to resign his office as one of the Honorary Secretaries was read. In accepting Mr. Carteighe's resignation, regret was expressed at the loss of his valuable services, and the thanks of the Committee were accorded to him for his services in the past. Mr. Sidney Plowman was then unanimously invited to act provisionally as an Honorary Secretary until an appointment could be made by the members at the approaching annual meeting.

The following gentlemen were elected members of the Conference:—Mr. D. Hooper, Birmingham; Mr. F. R. Squire, San Remo; Mr. M. R. Whitla, Monaghan.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The annual meeting of this Association was held on Thursday, July 20. The President, Professor Attfield, F.R.S., in the chair.

The Honorary Secretary (Mr. Wyndham R. Dunstan) read the annual report of the Executive Committee, which showed an increase, not only in the number of papers read before the Association, but also in the number of attendances at the meetings. During the session sixteen papers and seven reports have been read before the Association. The following is the list of papers:—

"The Meaning of Science," by the Secretary; "Foods and their Values as Sources of Force," by Mr. A. J. Evans; "The Rise and Development of Pharmacy in Russia," by Mr. H. G. Greenish; "The Relation of Microscopic Organisms to certain Industries and Diseases," by Mr. C. H. Hutchinson; "The Chemistry of Cerium," by Mr. H. S. Elworthy; "Animal Parasites," by Mr. E. Haward; "Vapour Densities," by Mr. F. J. Yeatman; "Note on the Preparation of Calcium Hypophosphite," by Mr. F. W. Short; "Alkaloids," by Mr. F. W. Short; "Coal Tar Distillation and some of its Products," by Mr. R. A. Cripps; "Gas Analysis," by Mr. C. Thompson; "The Production of Benzoic Acid and Oil of Bitter Almonds from Toluene, Part I.," by Mr. A. T. Job; "Note on a New Variety of Euphorbia Amygdaloides," by Messrs. F. J. Yeatman and F. W. Short; "The History of Citrine Ointment," by Mr. R. A. Cripps; "The Preparation of Benzoic Acid and Oil of Bitter Almonds from Toluene, Part II.," by Mr. A. T. Job; "Note on some Reactions of Glycerine," by Mr. E. Marsh.

The following reports have been made by the members of the Committee of Reporters, which is appointed annually by the Executive Committee:—

Two Reports on Materia Medica ("Notes on American Drugs," "New Remedies"), by Mr. W. Elborne; Report on Inorganic Chemistry ("Electrolytic Quantitative Analysis"), by Mr. C. H. Hutchinson; Two Reports on Botany ("Chlorophyll," "Darwin's Researches on Plant Movement"), by Mr. J. O. Braithwaite; Report on Pharmacy ("Thorey's Researches on Hyoscyamine"), by Mr. H. G. Greenish; Report on Organic Chemistry ("The Investigation of a so-called Catalytic Phenomenon"), by Mr. Wyndham R. Dunstan.

The President, at the commencement of the discussion, congratulated the Association upon the completion of so satisfactory a session of work.

The adoption of the report was then moved by Mr. J. O. Braithwaite, seconded by Mr. H. S. Elworthy, and carried unanimously.

Mr. C. Thompson then proposed that the balance in the hands of the Association be devoted to the constitution of a Research Fund, to defray the expenses of materials used by members in the investigation of subjects forming the basis of communications to the Association.

This proposition received support from all the members who took part in the discussion, and finally the meeting resolved, "That the proposition be adopted, and that the matter be referred to the Executive Committee for the consideration and settlement of details."

Mr. R. H. Parker then proposed that in future the meetings of the Association be held at eight, instead of half-past eight, as heretofore, on the ground that eight o'clock was more convenient for the majority of the members.

This was seconded by Mr. J. O. Braithwaite, and after a discussion, was carried unanimously.

Messrs. F. J. Yeatman and W. H. Incc were then appointed as auditors to examine the Treasurer's accounts, which they reported to be correct.

After a hearty vote of thanks had been passed to the President, Secretary, and other officers of the Association, the meeting adjourned over the summer vacation.

Parliamentary and Law Proceedings.

A Small Fatal Dose of Laudanum.

A fatal case of poisoning of an infant is reported from Keyworth, and is remarkable for the alleged smallness of the dose. A "drop" of laudanum was administered one afternoon with castor oil, to an infant, three weeks old, for the cure of diarrhœa, to which the child had been

subject from its birth. Shortly after, the child became suddenly very ill. At half-past five on the same afternoon it was seen by Mr. Percy Blumer, when the child was lying with contracted pupils, livid lips, skin covered with perspiration, small pulse, and slow respiration. It could be roused with difficulty, and speedily relapsed into its former state. Notwithstanding the administration of emetics, and the use of cold effusions, the child died thirteen hours after it was first seen by Mr. Blumer. Death from 1 drop of laudanum has occurred before, but the repetition of an ascertained case of death after such a dose is worthy of record, if only to impress on the public and the profession the danger attending the administration of opium in any form to young children.—*British Medical Journal.*

Poisoning by Arsenic.

A sad case of accidental poisoning, having a fatal termination, has occurred at Ingoldmills, near Alford, Lincolnshire.

Amos Deans, waggoner, in the employ of Mr. Davison, farmer, purchased some arsenic four or five years ago, for the purpose of destroying rats. What was not used on that occasion was placed inside an American clock case, in a small spice box. Last week a nurse was engaged for Mrs. Dean, named Ellen Blades, a widow, and she, under the impression that the poison was baking powder, used some of it in making a fruit pudding. The pudding was partaken of by the nurse, Mr. Dean, and two children. Mr. Dean, remarking that it tasted "funny," asked what it had been made of, and on being told immediately replied that they were poisoned. Remedies were at once applied, and on Monday the patients appeared to have recovered, but later in the day, Mrs. Blades, who had taken the occurrence much to heart, became unwell, and rapidly got worse. Every attention was paid to her, but she died on Tuesday.—*Leeds Mercury.*

Poisoning by Vermin Killer.

Mr. J. C. Malcolm, the Leeds coroner, held an inquest at the Leeds Town Hall on Friday, July 21, touching the death of Eliza Motherby, domestic servant. The deceased retired to bed on Tuesday evening, evidently in good spirits. The following morning Dr. Creser, finding that she had not risen, called her, and knocked at her bedroom door a great many times, but as she did not respond he entered the room, and found her lying dead on the bed. Mr. Wright, surgeon, afterwards made a *post-mortem* examination of the body, the appearances of which led him to the opinion that death had resulted from some irritant poison. It was stated that on Monday last the deceased went to the shop of Mr. W. B. Ferguson, chemist, Great George Street, and asked for something to destroy mice. Mr. Ferguson supplied her, at her own request, with a sixpenny packet of "vermin killer." In answer to questions she said her name was Eliza Elwiss, and that she was employed by a Mrs. Marshall, residing in Lyddon Terrace. On receiving the packet she signed for it in Mr. Ferguson's book. On Wednesday morning a portion of the powder was found on the dressing table in the girl's room, and there were also some potted meat sandwiches, upon which was spread a quantity of the vermin killer. A razor was likewise found in the room. The girl's mother, who resides at Hensall, near Snaith, said she could not account for her daughter's act. The deceased received a sunstroke about four years ago. The other day she received a letter from her daughter, who said she was very poorly, and she hoped she would soon be sleeping in Hensall Churchyard.

The jury returned a verdict of "Suicide whilst in a state of temporary insanity."—*Yorkshire Post.*

Poisoning by Morphia in a Hospital.

A death under very distressing circumstances took place last week in Westminster Hospital. A man named Ebden was an inmate in one of the wards, suffering from severe heart disease, but sufficiently well to be able to sit up in the ward during the latter part of the day. In the same ward was another man, who was receiving hypodermic injections of morphia, which appear to have been given by the nurse in charge. One day, when about to give the customary injection, she placed the bottle containing the morphia solution on the table in the middle of the ward by which the man Ebden was sitting. He then seized the bottle and drank off about a tablespoonful of the fluid. Every effort was made to remove the fluid from the stomach, and to counteract its poisonous effects, but they proved fruitless, and the man died from the effects of the morphia. Such an event is extremely distressing, more particularly as it tends to lessen the confidence of the public in hospitals. The coroner's jury returned a verdict of "Death by misadventure," but added a rider that in their opinion the nurse was to blame for leaving poisons within reach of patients able to leave their beds. Those familiar with the working of a hospital will hardly concur in this opinion, but they will rather ask how it is that the nurse was in possession of the bottle of morphia. The coroner's jury would have done better service if, instead of trying to affix blame upon a nurse who was not shown to have been careless, they had elicited whether it was the custom in the hospital for the administration of hypodermic injections of morphia to be relegated to nurses. We have no hesitation in saying that such a practice is to be deprecated in the strongest possible terms. It is no part of a nurse's duty to determine on the necessity for such an administration, still less on the amount required, and, least of all, is a nurse qualified to inject the fluid. Had the administration of hypodermic injections of morphia been kept in the hands of the resident staff we presume a bottle of a strong solution of morphia would not have been in the ward, and could not have been left on the table. The case clearly points to a danger connected with the other plan, and we hope it will prove a warning to the authorities of all hospitals, and that precautions will be taken to prevent the repetition of such an unfortunate accident.—*Lancet.*

Poisoning by Sulphuric Acid.

The Bolton coroner on Monday investigated a case of poisoning by sulphuric acid. A number of houses in Derby Street were being whitewashed, and the occupants meanwhile placed a quantity of loose articles in a back street to be out of the way. Amongst these was a bottle of vitriol. A child named Alice Makin, aged five, took this for "Spanish juice" and drank a teaspoonful. She immediately became ill, and with difficulty reached home after falling three times, and died in four hours. A verdict of "Death from misadventure" was returned.—*Manchester Evening News.*

Reviews.

The New Hand-Book of Dosimetric Therapeutics. By Dr. Ad. Burggraeve. Translated from the French and Edited by H. A. Allbutt, M.R.C.P., L.S.A. London: David Bogue.

This book is an exposition of the dosimetric system of therapeutics, which was instituted by Professor Burggraeve, of the University of Ghent. Why the name dosimetric should be given specially to this method of treatment has never been obvious, neither is it made more so by a perusal of this book. Dosimetry, we are told by the translator in a somewhat rambling preface, "looks upon the two rival systems of medicine, allopathy and homœopathy as being both equally at variance with truth. Allopathy weakens the patient's system by bleedings, purgings, sweatings and fasting. Its massive doses also thoroughly nauseate and disorder him. Homœo-

pathy, as taught by its founder Hahnemann, is merely another kind of expectation, for its remedies consist of infinitesimal dilutions which have no materiality."

In theory no one will object to the main principles of the dosimetric system; in fact, they are so many truisms. Thus, Mr. Allbutt tells us that "the dosimetric method takes everything, however trifling, into consideration, such as the medical constitution, the individual constitution, the hereditary condition, the age and sex, and the mode of life; the treatment being modified according to the varying conditions of each case." Again Professor Burggraeve states that "dosimetric medicine is the art of appropriating remedies to the nature and progress of diseases, to their symptoms, and to individual idiosyncrasies." The translator, in his preface, makes a statement which is so remarkable that we quote it at length. "The great object in all treatment is that the medicaments should act by physiological catalysis, that is, they should excite certain movements of nutrition, etc., without themselves participating in those movements, either chemically or physically. Hence may be seen the danger of giving too large doses of any medicament, for if such is done the economy is disordered, irritated and depressed. Every medicinal agent, when administered according to the dosimetric method, has an elective action, that is, each goes naturally to its proper address, but not otherwise." We are not discussing or criticizing the book from a literary standpoint, so let pass with mere comment the verbal contradiction and misuse which characterizes the above paragraph. Catalysis has recently been the subject of special comment in this Journal and its worthlessness as an explanation pointed out; the subject need not, therefore, detain us here. The opinion expressed in the sentences above quoted indicates, at least, an absence of knowledge concerning the fundamental facts of physiology and pathology.

Turning now to the remedies employed by dosimetry. It is stated that "dosimetry prescribes powerful remedies in a pleasant form, accurate in composition, reliable in action, and which are measured to the urgency of the case." What system of medicine, properly so called, it may be asked, does not also aim at this? This is in reality not the question, the real point is whether the means employed by any given system are capable of effecting these obviously desirable ends. Dosimetry proposes that the use of drugs in the crude form, and this includes all galenical preparations, should be abandoned, and the active principles of these drugs only employed. The fact that in a great number of cases the same therapeutical effect is not obtained from a separate active principle as from the drug itself is a sufficient objection to this proposal. And further, in many cases the active principle has never been isolated. Are we on this account to abandon the use of a powerful remedy? The case of ergot is a notable example of this. Recent work has thrown much light upon the matter, but we are not yet in possession of the active constituent or constituents in a pure state. It is an interesting and significant fact that among the "powerful remedies, accurate in composition," employed by this system occurs "ergotine," which name has been used to designate at least two preparations of ergot, both of which may be regarded as little more than fluid extracts of the drug.

The pharmacy of dosimetry is barely touched upon. It is evident, however, that as all the proposed remedies are merely definite quantities of metallic salts, alkaloids, etc., made up into pilules with sugar, even if the system was generally adopted two or three manufacturers would suffice to supply the whole of this country or indeed of the civilized world. Thus the pharmacist, as we now know him, would, if he existed at all, be reduced to the position of a mere vendor of these pilules. The translator, however, thinks, or rather says, otherwise. "Chemists need not fear that the new pharmacy will work them harm, rather will it elevate them into scientists, making them not mere vendors of quack medicines, but skilled preparers of drugs, giving them a new position equal to that of their medical *confrères*." It is almost needless to say that there is not the slightest indication given as to how this wonderful transformation is to be effected. The only passage having the least bearing upon the question is the following one, which is of paramount interest as it admirably confirms and gives authority to what we have stated would be the inevitable effect that the adoption of the dosimetric system would have upon pharmacists. "Let me caution those physicians who adopt the dosimetric method, and who desire to obtain uniform results in the treatment of cases, to be on their guard against all coarse and cheap imitations of the Chanteaud granules. No granules are genuine or reliable but those which are manufactured by M. Charles Chanteaud, the eminent Parisian pharmacist. To these only has Dr. Burggraeve attached his signature as proof of their reliability."

The whole book is written in a style which will not recommend itself to English readers. In many parts one feels that it is more of a "talk" about the subject than an exposition in a serious and systematic manner.

Examination Questions on the Medical Sciences. Selected and Arranged by James Greig Leask, M.B. Abdn. London: Baillière, Tindall and Cox. 1882.

A question suggested not unnaturally by the title of this book is, Do examiners also cram? This fear, however, may be allayed by a perusal of the brief preface, in which it is stated that the author aims at providing, in a convenient form, such a concise collection of questions as will prove useful to the medical student. To attain this end "university calendars, army medical reports and medical periodicals have been consulted;" but with result before us we are constrained to ask, *Cui bono?* We confess we cannot find an answer, although it may be assumed that at least the author and publisher would be ready with one. Even if the careful consideration of examiners' questions were the most satisfactory method of studying a science, this book is not sufficiently complete to be of much value. It is true that examiners are credited with asking wide questions; but we do not think, for instance, a medical student would be safe in expecting that he would be more likely to be asked to describe the genus *Carex*, or the geographical distribution of the Magnoliaceæ, than for particulars about such orders as Euphorbiaceæ, Scrophulariaceæ, Solanaceæ, or Polygonaceæ. Yet the former questions are quoted, but we do not see anything more nearly representing the latter than the following rather elastic question, "Describe the natural orders of plants and their essential distinctive characters." At a first glance it seemed that an important subject of a medical student's examination was omitted, there being no special section devoted to materia medica. But some of the sections are very inclusive, as may be seen from the fact that a question as to the external characters by which the substitution of dulcamara leaves for belladonna leaves may be discovered is found under "Medical Chemistry." The book is neatly printed and bound.

Notes and Queries.

[733]. Coloured Carboys.—Could any reader give me information as to the origin of the custom of chemists placing carboys containing coloured liquids in their shop windows?

I have been unable to find any information on the subject in books.

John R. Hill.

[734]. Decoct. Sarsæ Co. Conc. c. Quinia.—"Lex" would be obliged for formula for a miscible compound of dec. sarsæ co. conc. and quinine.

[735]. TINCT. OF EUONYMIN. — Could any reader oblige me with a reliable formula for tinct. euonymin, which I have frequently had occasion to make?

THETA.

[736]. TINCT. DATURÆ TATULÆ.—Can anyone give me a form for tinct. daturæ tatulæ in next impression of *Pharmaceutical Journal*?

INQUIRER.

Correspondence.

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

THE FUTURE OF PHARMACY.

Sir,—I was very much pleased to see a letter from Mr. Hart appearing in the issue of the 15th inst., as I think it points to a very serious drawback to our trade; viz., the grasping propensities and love of filthy lucre which lead men in the trade to supply hucksters and other general dealers with drugs and pharmaceutical preparations, to the detriment of their more consistent brethren. When I was an assistant, in one situation which I filled the master himself used to go out soliciting orders from hucksters for drugs, pills, etc., and would not scruple to supply them even with laudanum, if he thought they would be sure to pay him for it; and yet I see his name appearing as a member of the Chemists' Defence Association. Since I have been in business, I have experienced much competition from hucksters in the retail drug line, aided and abetted by such as I have referred to. Only yesterday, a girl came into my shop, with a packet of rhubarb in her hand, for a pennyworth of white precipitate, because she could not get that where she was in the habit of buying the rhubarb and other drugs. There, I think the huckster had the best of it, as the law will not allow him to sell dangerous preparations; that unenviable business is reserved for the pharmacist. If, as Mr. Hart says, every member of the trade would be true to the interests of the trade, it would be much better for all of us. What with competition from hucksters, general supply stores, etc., and low prices by members of our own craft, our trade is not up to much. The would-be pharmacist of the future will probably, before he goes through a compulsory curriculum, come to the conclusion that the "game is not worth the candle." A great deal of this competition from outsiders is encouraged and supported by men like my example, who will do anything for the sake of gain, and yet belong to an association for defending the interests of pharmacists. But perhaps that is their peculiar way of defending and promoting the interests of their brethren. In regard to patents, I find that by breaking the government stamp, we can then retail the medicine out in any quantities. I question whether it would not pay to buy the largest size of the most extensively used patents and then retail the remedy out in any quantity the customers desired. This would save many the nuisance of being obliged to part with 9½*d.* every time they want a dose of So-and-so's pills, powders, cough stuff or lozenges, and although the turnover would be small, it would no doubt take much of the trade from tailors, hucksters, stores, etc., and put a little more in our own pockets. Many of the outsiders would not care to spend the time in measuring and labelling medicines, the druggist would be on more level terms with them then, besides the advantage of always recommending our own remedies in preference. Now that a fair profit is so seldom obtainable on what was once the paying part of a chemist's business it is time to do something. It is the outsiders dealing in such large quantities and having such enormous turnovers, that has beaten the ordinary chemist; but when it comes to small quantities, then we are more in our element.

I hope my letter may draw forth some opinions on the subject that will lead to practical good.

PILL MAKER.

FRESH BAEL FRUIT (ÆGLE MARMELOS).

Sir,—A quarter of a century since I used to procure for a customer of mine, residing at Boulogne-sur-Mer, a not inconsiderable quantity of the "Confection of Bael," which was supplied under the more homely name of "Bael Preserve or Jelly." I invariably procured it from Mr. Pound, who then occupied the old established pharmacy in Oxford Street, at the corner of Orchard Street, as I understood it was a specialty of that house. If anyone will take the trouble to refer to vol. x. of the *Pharmaceutical Journal*, for 1850, he will find on page 165 an interesting account and an illustration of the bael plant. I do not recollect whether Mr. Pound's preparation was made from the ripe fruit or from the unripe fruit or half-ripe fruit, or whether it was made in London or at Malabar, but anyone reading the paper will see that certainly it gives Mr. Pound the credit of first importing the fruit, and looking again over the paper I find that the "preserve" appears to have been made from the fruit in various conditions.

Pharmaceutical history, like other histories, "repeats itself," and different people are frequently making the same discoveries. I might mention the instances of phosphorized cod liver oil and the tincture of quinine made with the hydrochlorate instead of the sulphate of quinia.

It would be hypercritical as well as irreverent to class the discovery of the so-called new remedies with the finding of a "mare's nest." *Per contra*, is it not somewhat euphemistic to attach any great amount of novelty to them?

13, *Baker Street. W.* JOHN TAYLOR.

Theta.—The deposit should be examined; probably it is thrown down from the infusion of cinchona by the potassium iodide.

N. J. Lewis.—You are recommended to communicate with the Registrar upon the subject.

J. Miller.—*Sedum reflexum.*

D. S. Barbet.—Acetate of morphia is not a stable salt, being completely soluble in water only when freshly prepared. If kept there is a gradual elimination of acetic acid, with the formation of a basic compound, See a paper by Merck in *Pharm. Journ.*, [3], vii., 229.

J. T. Lloyd.—We are much obliged to you for taking the trouble to translate the report. See, however, p. 78 in the number for last week.

W. Ashton.—Your letter has been forwarded to Mr. Will.

M.P.S.—*Liquid Dentifrice.*—The following recipe has already been quoted from an American source:—Soap bark, 4 ounces; glycerine, 3 ounces; diluted alcohol, sufficient to make 2 pints; oil of gaultheria and oil of peppermint, of each 20 drops. Macerate the soap bark in the mixture of glycerine and alcohol for three or four days, and filter through a little magnesia previously saturated with the essential oils. See also p. 89 of the present number.

Toxicologist.—Taylor, "On Poisons" (Churchill).

T. D. Sneath.—Carbolic acid is soluble in 15 parts of water. We cannot assist with information as to the composition of the proprietary preparations mentioned.

T. O. Sandell.—For an account of salep, see 'Pharmacographia.' "*Salib misri*" is a kind of salep met with in the Indian bazaars, derived from species of *Eulophia*. Possibly a supply could be obtained through Messrs. Christy, Fenchurch Street.

W. Miller.—*Filago germanica.*

John Brown.—The specimens are apparently both referable to the same species, *Chiococca racemosa.*

J. Hutchinson.—*Impatiens parviflora.*

A. P. S.—Periera's 'Materia Medica.'

Beautifier.—We do not think it desirable to publish your letter, but would suggest that if you are acquainted with any person in the business you might bring your views under his notice.

Anthony.—All communications respecting advertisements should be addressed to Messrs. J. and A. Churchill, 11, New Burlington Street, W.

X. Y. Z. is referred to the rule respecting anonymous communications.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mee, Lewis, Hart, C. E. L., C. S., S. L.

TRADE NOTICE.

WRIGHT, LAYMAN AND UMNEY

BEG TO INTIMATE THAT

THE FIRE ON FRIDAY,

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Wright's Coal Tar Soap and "Liquor Carbonis Detergens," &c., can be obtained of any Wholesale Druggist or Wholesale Patent Vendor in the United Kingdom, or from the Proprietors, Southwark (S.E.), as usual.

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Eczema, Psoriasis, Corns, Warts, Diphtheria, &c., &c.

Mr. Malcolm Morris, in *British Medical Journal*, May 20, 1882, p. 738, relating his experience with Papaw in Chronic Eczema, says:—"I have had such marked success with it that I recommend it to the profession as a remedy worthy of trial in cases which often resist all the ordinary modes of treatment. . . . In some other cases of chronic eczema and psoriasis the same benefit has followed in as short a time as in the case above mentioned."

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We have just received a fresh supply of this drug, which will be found the cheapest and most efficient.

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Assistant-Physicians—Dr. Charlewood Turner, Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Hutchinson, F.R.S., Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Fredk. Treves, Mr. C. Mansell Moullin.
Obstetric Physician—Dr. Palfrey.
Assistant Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. James Adams, Mr. Waren Tay.
Aural Surgeons—Dr. Edw. Woakes and Mr. T. Mark Hovell.
Surgeon-Dentist—Mr. Ashley W. Barrett.

LECTURERS.

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Operative Surgery—Mr. Jas. Adams.
Practical Surgery—Mr. Reeves.
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Practical Anatomy—Mr. Fredk. Treves.
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Toxicology—
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. C. Meymott Tidy.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy & Pathology of the Teeth—Mr. Ashley W. Barrett.

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Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

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A Scholarship, value £20, in Human Anatomy and Physiology, to first year's Students.

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A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

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JULY, 1882.

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Mr. A. NICHOL.

Bronze Medal.

Mr. H. E. CULLWICK.

Certificates of Merit.

Mr. W. WEDDLE.
,, R. PINDER.

MATERIA MEDICA.

Bronze Medal.

Mr. J. R. EVANS.

Certificates of Merit.

Mr. J. BOWERING.
,, W. H. P. SHAPCOTT.
,, G. DANIEL.
,, HANKINSON.

JUNIOR CHEMISTRY.

Bronze Medal.

Mr. H. E. NOBLE.

Certificates of Merit.

Mr. A. PELLEW.
,, ELSTOB.
,, SANDERSON.

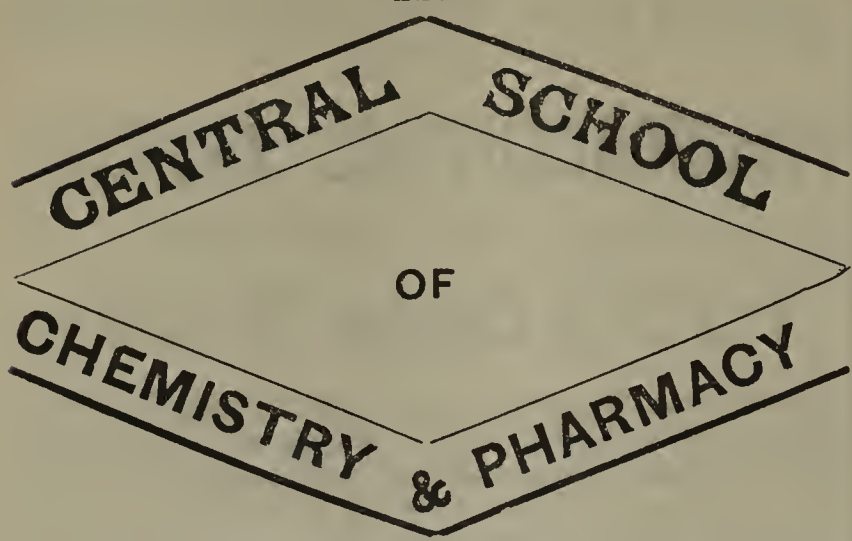
BOTANY.

Bronze Medal.

Mr. R. D. MILLWARD.

Certificates of Merit.

Mr. J. H. FROST.
,, J. F. GUMMOW.
,, W. G. WELLS.



At the Examinations held in June the following Students of this School were successful.

MAJOR.
*Mr. W. A. Shephard.

MINOR.
*Mr. W. H. Dangerfield. | *Mr. T. W. Lowther.
* „ J. T. Hall. | * „ E. Wilkins.

At the July Examinations the following Minor Students from this School were successful.

Mr. S. Allen. | *Mr. J. Meadows.
* „ W. Evans. | „ W. Pearson.
* „ A. Hall. | * „ W. H. Thomas.
* „ C. Hanson. | * „ H. H. Townsend.
* „ T. S. Hodgson. | * „ J. R. Wood.
„ W. M. Jackson. | * „ W. J. Williams.

* These Students passed the first time of presentation.

The next Session will commence on September 1st.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS, A.P.S., G.S.T., &c.
130, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE EARLY IN SEPTEMBER

EIGHT of my Students presented themselves at the JULY Minor, **SIX** passed. Three others received their finishing instruction from me, but being at other schools at the time of passing are not included in the above total. **TWO** out of **FOUR** of my pupils passed at the JUNE meeting.

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Special teaching (private or postal) for OCTOBER candidates. Enclose stamp for particulars.

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Director—GEORGE S. V. WILLS, F.L.S., F.R.M.S.,
Fellow of the Royal Botanic Society.

The next Session will commence on FRIDAY, SEPTEMBER 1st.

Pharmaceutical Department.

FEES.

PRELIMINARY	One Month	£2 2s.
	Until Qualified ...	£5 5s.
MAJOR or MINOR (*From September 1st*).	October Exam. ...	£4 4s.
	December „ ...	£8 8s.
	Until Qualified ...	£10 10s.
MAJOR AND MINOR .	Until Qualified ...	£15 15s.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

The soundness and thoroughness of the education is demonstrated by the fact that half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College.

A completely fitted Dispensary is attached to the College for the benefit of those students who require instruction in this department.

Students can enter at any time, provided there are vacancies, but are advised to come at the commencement of a course.

Pass List of the Westminster College, July, 1882.

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„ G. Murray
„ J. Wheatley

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„ W. J. Cope
„ H. M. Harradine
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„ G. Daniel
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For prospectus and further particulars, apply personally or by letter, to Messrs. WILLS & WOOTTON, Trinity Square, London, S.E.

THE

EASTERN COUNTIES SCHOOL OF PHARMACY.

Mr. W. S. TURNER has "again" passed all his men. Two entered at Edinburgh, both passed—Mr. J. HADDON, Mr. S. BOSTOCK.

The Manchester College of Pharmacy.

Mr. W. S. TURNER expects to be in Manchester before July 29th, and hopes to arrange very soon to receive Day, Evening, and Private Pupils.

Success in *proportion of passes* has now been secured, success in *number of passes* will follow.

Fees as usual. Address either "Grimsby" or "Manchester." Location will be advertised "quam primum."

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

A QUALIFIED Chemist having lately given up business, is willing to act as TEMPORARY MANAGER or LOCUM TENENS. Excellent references. Terms, 5s. per day, 35s. per week. CHEMICUS, Auction Offices, Vicarage St., Frome, Somerset.

AS JUNIOR in a good-class Dispensing business, where 2 assistants are kept. Age 19. Nearly 4½ years' experience. Height 4ft. 8½in. JUNIOR, 37, Market Hill, Cambridge.

LOCUM TENENS or TEMPORARY. Town or country. Terms moderate. Excellent references or testimonials. R. E. BUNN'S (of 12, Unity Pl., Woolwich) present address: Mr. Wallworth's, Chemist, Maldon, Essex.

AS ASSISTANT. With 17 years' experience. Apothecaries' Hall. Good references. H. WHIFFIN, Bedford.

TO Dispensing Chemists.—Advertiser, age 21, 7 years' experience in Dispensing, desires a situation where he could acquire a knowledge of the Retail, with time for study. Excellent references. Passed Prelim. DISPENSER, Dr. Jalland's, Horncastle.

AS ASSISTANT. Mixed country business. Midlands preferred. Age 26. Height 5ft. 7in. 11 years' varied experience. Disengaged. State salary. In or out-door. SPES, The Hollies, Boulton, near Derby.

AS out-door ASSISTANT or MANAGER, by a married man, age 30. Speaks French. Good references. Permanency desired. K., 26, Vincent Sq., S.W.

ADVERTISER is seeking an engagement. Has Minor and Hall qualifications. Ætat. 26 years. 12 years' experience. Disengaged. State particulars. CHEMIST, 29, Turner's Rd., Burdett Rd., E.

BY a good energetic JUNIOR, in London, with time for study or attend classes. 7 years' good experience. Ætat. 23. SPES, Mr. Reynolds, Owston, Ferry, Doncaster.

ENGAGEMENTS WANTED.

OUT-DOORS, by a gentleman, age 30. Experienced in Prescribing and Tooth Extracting. Salary 30s. weekly. MEDICAL, care of Mr. Smith, 157, New North Rd., Islington, N.

TEMPORARY ASSISTANT or MANAGER. A Registered Chemist is open to engagements by the day or week. 30 years' town and country experience. LOCUM TENENS, 4, Manor Villas, Goodrich Rd., East Dulwich, S.E.

AS ASSISTANT, with time for study. Accustomed to first-class business. Scotland preferred. F. THOMPSON, Prospect House, Westgate, Thirsk, Yorks.

DISENGAGED.—As ASSISTANT. Age 23. Town or country. 8 years' experience. Good references. A. B., 2, Devonshire St., Brighton.

ASSISTANT or DISPENSER, for a few hours during the day, by one preparing for the Minor. Age 21. Experience, 7 years' town and country. I. H., 94, Buckingham Rd., Canonbury, N.

IN good Dispensing and Retail. Age 22. Excellent references. Disengaged shortly. SINE, 3, Norfolk St., King's Lynn, Norfolk.

AS ASSISTANT in a good Dispensing business. Age 24. Disengaged 14th proximo. Good reference. J. M. WELLER, Mr. Smithson's, Chemist, 1, Preston Rd., Brighton.

AS ASSISTANT, MANAGER, or TEMPORARY. Thorough experience. Now disengaged. 3 years' reference from last place. Out-door preferred. Am registered. ALPHA, 227, Mayall Rd., Herne Hill.

AS JUNIOR or IMPROVER in good Dispensing business, with light hours. Age nearly 20. Height 5ft. 5in. Good references. H. E., 97, Fore St., Ipswich.

AS JUNIOR in light Retail and Dispensing business. Good experience and references. Age 21. Height 5ft. 5in. W. S., 37, Market Place, Driffield.

BY a qualified ASSISTANT. Age 22. A good Dispensing and Retail business in London. Where more than 1 kept preferred. W., 16, Merrick Sq., S.E.

BY a qualified man, a situation as ASSISTANT in good house of business. Or as MANAGER, with a view to partnership. Age 28. W., 134, Buckingham Palace Rd., S.W.

DISPENSER, MANAGER of Branch, or out-door ASSISTANT. Wholesale or Retail. Long experience. Good references. Town or suburbs. J., 10, Coln Villas, Mill Hill Rd., Acton.

AS ASSISTANT to Chemist or DISPENSER to a Surgeon. Hall qualification. Age 21. J. H. T., 68, Portland Rd., Holland Park, W.

AS JUNIOR. 5 years' experience. Age 22. T. W. K., 68, Portland Rd., Notting Hill, London, W.

AS ASSISTANT or MANAGER. 10 years' experience. Age 26. Now disengaged. Height 5ft. 11in. Speaks French. No objection to France or abroad. R. E. T., 41, Silver St., Salisbury.

AS JUNIOR. Age 21. Height 5ft. 11in. 4½ years' experience. ALPHA, 26, Westgate St., Ipswich.

AS JUNIOR in a good Family and Dispensing business in Manchester or district. Age 20. 4½ years' experience. Unexceptional reference. W. P., 77, Mill St., Macclesfield.

AS JUNIOR in a good house, with comfortable home. Small salary required. Age 19½. Height 5ft. 6in. 4 years' experience. Undeniable references. G. TUCK, 29, St. James' Rd., Southsea, Portsmouth.

LOCUM TENENS.—By a gentleman (Pharm. Chemist) of good address and long experience, to take charge during absence. Disengaged Aug. 11th. PHARMACY, 7, High St., Upper Sydenham.

ENGAGEMENTS WANTED.

AUSTRALIA or New Zealand.—A gentleman who has had 16 years' experience in the best Chemist's shops in the north, during 9 of which he has been either Manager or Principal, is desirous of an engagement in either of the above colonies. Unexceptional references, both for business ability and personal character. Age 31. Minor qualification. Married. 2 children. J. H., care of Messrs. James Woolley, Sons & Co., Manchester. P.S.—Good Veterinarian.

AS IMPROVER or JUNIOR in a good class Retail and Dispensing business. Age 19. 4 years' experience. Excellent reference. JUNIOR, Mr. Woodward, Market Pl., Biggleswade.

AS ASSISTANT. Age 24. Minor qualification. Accustomed to light Retail and Dispensing. Particulars to R. F. WRIGHT, Wilbinton, Ely.

AS ASSISTANT. Age 22. Height 5ft. 10in. Unqualified. Disengaged shortly. H. A. T., 15, Commercial Rd., Bournemouth.

AS ASSISTANT. Ætat. 23. Height 5ft. 10in. Apothecaries' Hall qualification. Time for study. Town experience. QUAM PRIMUM, J. Baty, Shipbourne, Tunbridge.

AS ASSISTANT or DISPENSER. Minor qualification. Age 21½. W. J. WILLIAMS, 5, Lisson St., Marylebone Rd., London, N.W.

OUT-DOORS, or to take MANAGEMENT of a country business. Age 35. Registered. 18 years' experience. Salary 30s. per week without board. A. Z., 4, Blythe Ter., Forest Hill, S.E.

LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. Over 30 years' town and country experience, and unexceptionable references extending over the last 12 years. Disengaged August 3rd.

ASSISTANTS WANTED.

IMMEDIATELY.—A Junior ASSISTANT, of good character, and accustomed to good-class business. One with the Minor qualification preferred. Apply, personally or by letter, stating full particulars as to age, salary, references, &c., to Mr. R. TRIST, Pharmaceutical Chemist, Pinner, N.W.

AN ASSISTANT, about 23. In-doors. Must have been accustomed to light Retail and Dispensing. State age, height, references, and when at liberty. Address, C. S., care of Heywood & Jones, Corporation St., Manchester.

SHORTLY.—A gentlemanly ASSISTANT, possessing the Major qualification, as Dispenser, in a first-class business in an inland watering place, where 3 assistants are kept. Age about 22. Apply, stating height, salary required, &c., furnishing references and enclosing (if possible) carte, to be returned, to M. H. E., care of Messrs. Hodgkinsons, 198, Upper Whitecross St., E.C.

THE end of August.—A steady JUNIOR or IMPROVER, able to Dispense, with good references, for a Mixed country trade. A Christian young man, Dissenter, preferred. Small salary first 6 months. State full particulars, salary required, age, height, and carte, to WILLIAMS, Chymist, Coleford, Gloucestershire.

BY the 3rd of August.—To fill vacancy during holiday, for about three weeks. An ASSISTANT accustomed to light Retail and Dispensing. Please state full particulars as to salary, &c. Address, APOTHECARY, care of Mr. George Grant, Bridge St., Northampton.

A GOOD Junior ASSISTANT. Not under 22. Accustomed to good class Family and Dispensing business. Accurate Dispenser. Hours, 7.30 a.m. to 7 p.m. Apply, stating age, height, references, and salary required, with carte (to be returned), to JOHN EKINS, 97, High St., Bedford.

ASSISTANTS WANTED.

OUT-DOOR.—A competent ASSISTANT as head Counterman, in a large business. Must be active and energetic, with first-class references. Apply, giving full particulars, age, height, salary, &c., to C. P., care of Evans, Lescher & Evans, Bartholomew Close, London.

AT once.—A married ASSISTANT, age 35 to 45, to manage a Mixed branch. A steady and experienced man. One used to Prescribing and Teeth Extracting. Apply, with full particulars (enclosing carte) as to salary, experience, &c., CHEMICUS, Shackleton, East Parade, Goole.

IMMEDIATELY.—A qualified ASSISTANT as Second. Age about 22. Who has been accustomed to first-class Dispensing business. Apply, BARNETT & Co., Buxton, Derbyshire.

IN an open and healthy neighbourhood. Duties light. A competent ASSISTANT. Must be a good Counterman, and well used to Dispensing, Prescribing and light Retail. Preference will be given to one experienced (or open to become so) in the Optical and Surgical Appliance branches, or a good Dentist without capital seeking an opportunity for working up a first-class connection. Offers, usual particulars, all previous engagements, and carte, to HOMŒOPATHIST, care of Hodgkinson & Co., 198, Upper Whitecross St., E.C.

MONTREAL.—A qualified ASSISTANT, about 23 years of age. Out-door. Must be a good Dispenser and possess first-class references. Apply, with carte, to SOUTHALL BROS. & BARCLAY, Birmingham.

APPRENTICE. Immediately. In a first-class Retail and Dispensing business, in the West-end, a well educated youth as an APPRENTICE. 5 others employed. A good premium required. A. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

A VACANCY occurs in a large Dispensing and Retail business, on the South Coast, for an APPRENTICE. Particulars of E. B., Messrs. Barron, Harveys & Co., Giltspur St., E.C.

A COMPETENT trustworthy ASSISTANT, of good address, about 25 years of age, who can produce unexceptionable references. One passed the Minor and capable of Extracting Teeth preferred. Apply, with particulars as to age, height, salary, &c., enclosing carte (to be returned), to JAMES D. HAZARD, Dispensing Chemist, Bournemouth.

ON demande dans une ville de Saison au midi de la France un ASSISTANT anglais parlant le français, étant âgé au moins de 25 ans, ayant une belle présence très capable, et pouvant donner de bonnes reférences. Bons appointements. S'adresser pour tous renseignements à Messieurs BARRON, HARVEYS & Co., Giltspur St., ou à Messieurs S. MAW, SON & THOMPSON, Aldersgate St.

A MANAGER, on September 1st, for Branch shop. In-doors. Comfortable home. Wesleyan preferred. References must be exceptionally good. Personal interview before closing. Apply, C. W. DIXON, Chemist, 115, Mansfield Rd., Nottingham.

AN ASSISTANT, to Manage small Retail. West of London. Must be obliging, steady, and his references must bear the strictest investigation. Age from about 28 to 35. Salary to begin at £80 per annum, with unfurnished apartments. Candidates will have to apply personally, by appointment, and will do so at their own expense. Apply to L. M., care of Messrs. Newbery & Son, 1, King Edward St., Newgate St., London, E.C.

MESSRS. ARGLES & STONHAM, Maidstone, have a vacancy for a Junior ASSISTANT. State age, height, salary required, and experience.

AS JUNIOR or IMPROVER. In a light Retail and Dispensing business. An obliging and trustworthy young man of good address and thorough business habits. Apply, with full particulars as to age, height, salary, &c., to W. DODDS, Chemist, Hessle Rd., Hull.

ASSISTANTS WANTED.

AN ASSISTANT, about 25 years of age. Out-door. Accustomed to Dispensing and general country trade. Hours moderate, and no Sunday work, except in absence of employer. Address, with particulars, R. ROPER, Dunmow, Essex.

AS Dispensing ASSISTANT. A thoroughly efficient gentleman, whose antecedents will bear strict investigation. Plenty of work. Liberal salary. Address, stating age and height, and enclosing carte, to X., Mr. Day, 53, Market St., Manchester.

AN active JUNIOR for a West-end house. Apply, between the hours of 2 and 6 p.m., at 65, Charing Cross (near Spring Gardens).

AT once.—As Second ASSISTANT. Age about 22. Minor or Hall qualification. Experienced Dispenser. Good writer. Hours of business 8 to 8.30. Allowed 1 evening a week and whole of every other Sunday. Salary £45. Useless writing. Must apply personally, mornings 10 to 12, evenings 6 to 8. D. WHITE & SON, 19, Park Ter., Regent's Park.

A GENTLEMAN, engaged in study or otherwise during forenoon and afternoon, wishing to give the rest of his time for board and lodging. Apply (if by letter, enclosing photograph and giving age, experience and references) to H. J. LANGHAM, 74, Mountgrove Rd., Highbury. Applications 4 days unanswered declined.

A GOOD JUNIOR, capable of taking charge when necessary. To sleep out. Apply to EDWIN BING, Pharmaceutical Chemist, Canterbury, stating salary, &c., with carte, to be returned.

A JUNIOR ASSISTANT, accustomed to a general Retail, Dispensing and Prescribing business. Apply, stating age, height, and salary required, to GEORGE ALEXANDER, 40, William Henry St., Liverpool.

AN ASSISTANT, experienced in Dispensing and light Retail. Apply, stating age, height, references, salary required and when disengaged, to H. JEFFERY, 110, Cheltenham Rd., Bristol.

AN ASSISTANT, accustomed to a good Dispensing and Family trade. Apply, stating age, height, salary required, &c., to J. P. PROVOST, Pharmaceutical Chemist, Huntingdon.

FOR the Wholesale, a Junior INVOICE CLERK. Apply by letter, stating full particulars, to B., 94, Shaftesbury Rd., Crouch Hill, London, N.

G. D. HORTON, M.P.S., Dispensing Chemist (from the General Hospital, Birmingham), has a vacancy for a highly respectable youth as an APPRENTICE. Good home, and time allowed for study and attending lectures. Premium required. Highest references exchanged. Established 1860. Address, Aston House, Corner of Sutton St., Aston Rd., Birmingham.

MR. T. J. HUNT, Southgate St., Gloucester, is in immediate want of an ASSISTANT. About 22 years of age. Of good appearance and address. Accustomed to Dispensing and light Retail. Send usual particulars, enclosing photo., if convenient.

A THOROUGHLY competent, energetic ASSISTANT, of good address. Accustomed to first-class business. Full particulars to RASTRICK & SON, King's Rd., Southsea. Also an IMPROVER or Junior ASSISTANT.

AN energetic young man, single, to MANAGE a light Retail and Prescribing business. Must have a good knowledge of Dentistry. Unexceptional references. Apply, stating age, salary, and enclose carte, to J. THORP, Chemist and Dentist, 1, Cornhill, Bridgwater.

DRUG and Grocery.—A young man, about 22, for Drug counter, and to assist at grocery and travel when required. Full particulars to JOHN C. COLES, Chippenham, Wilts.

BUSINESSES FOR DISPOSAL.

PROMINENTLY situated in one of the main thoroughfares, N.W. of London. Capital mahogany fittings and good appearance. Established nearly 20 years. To be sold in consequence of decease of late owner. Unexpired lease; 10 years to run. Estimated value of the whole £500. Apply, by letter, to A. E. G., care of Messrs. Maw & Son, 7 to 12, Aldersgate St., E.C.

IMMEDIATELY.—Proprietor taking another Business. An old-established BUSINESS, in Herts. Doing an increasing and profitable trade. Good house. Large corner shop. Rent low. The shop is well fitted and stocked, and will be sold at valuation, with or without stock, to suit purchaser. Apply to L., care of Barron, Squire & Co., Bush Lane.

GENUINE Chemist's Dispensing and Prescribing RETAIL. Plate-glass front. Corner position. Main thoroughfare. Returned last year over £500. Rent £36. 2 appointments, value £80, secured if taken before August 19th. A week's trial allowed. Price £375. Address, BRENNAN, 16, Great Clowes St., Manchester.

TO be Sold by Auction. The entire stock of Drugs, Patents, Sundries, Shop Bottles, Fittings, Wall and Counter Cases, Shelving, Cornices, handsome Specie Jars, very fine 16-gallon Carboys (the latter were in the Exhibition of 1851), solid mahogany Counters and Drawers, very fine stock of Drugs, Sponges, &c. The Drugs are mostly Herrings' sundries and Maw's, quality guaranteed. Fittings by Kidston. The whole formed a West-End Pharmacy, and will be sold without reserve. Catalogues on application. Would be sold privately in one lot. Messrs. DRIVER & PERFECT, Auctioneers, 8, Seven Sisters Rd., Holloway, N.

THE oldest established general Retail and Prescribing BUSINESS, in one of the most favourite and rapidly rising Watering-places of North Wales. Double plate-glass fronted shop, well fitted and stocked. Private entrance. Low rent. Held on lease. Price to an immediate purchaser, £350. R. B. M., Evans, Sons & Co., Liverpool.

THE old established and profitable Retail BUSINESS, carried on for nearly 30 years by Mr. BENJN. ROBINSON, Pharmaceutical Chemist, Pendleton, Manchester, who is retiring. Apply direct.

DRUG BUSINESS. Doing £20 per week. Near Nottingham. Will be sold by valuation or otherwise. Good thriving district. Illness cause of disposal. Every information. Write to R. TOMLINSON, Druggists' Fitter and Valuer, 15, St. Paul's Sq., Birmingham. The Fixtures of a good shop, entire, for sale. Would be made to fit. All parties fitting write for lists.

SHROPSHIRE. — A genuine bonâ fide BUSINESS. Dispensing, good Retail, Prescribing and Agricultural. Full prices. Handsome shop. Must be sold at once. Returns nearly £1100. Price £750. This is an old established concern, and reference can be given to Southall Bros. & Barclay, of Birmingham, and other firms. AQUARIUM, care of Southall Bros. & Barclay, Birmingham.

IMMEDIATELY.—The most handsomely fitted SHOP in Manchester. Doing good Retail and increasing Dispensing, at full prices. Splendid position. Populous neighbourhood. Convenient premises. Owner going into the manufacturing. The best business in the market, and should be seen. Apply, J. SOUTHERN, opposite the Assize Courts, Manchester.

MR. HINE GILBERT is desirous of finding a purchaser for a BUSINESS established many years in best part of a fashionable sea-side town. Many years in present hands. It will be sold a bargain. Full particulars at 17, Hart St., Bloomsbury Sq.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for disposal:—DEVON (Coast). Good-class Trade. Returning £800. Trial given. Only £550. W. OF ENGLAND. First-class Dispensing Trade. Returning £800. Price year's returns. SOUTHERN COUNTY. Retail and Dispensing Trade. Handsomely fitted. Returning £1000, at full prices. Good house and garden. KENT. Returning £700. Under manager last 8 years. Open to offer. SURREY. 10 miles out. Returning £5 weekly. Through illness. Only £75. LONDON, S.W. Returning £700. £650, or offer. N. Returning £7 weekly. Neglected. Only £150, and half can remain. Unusual chance to young man commencing. HANTS. Fashionable Watering-place. Returning £550. Very handsome shop. Large house. Best position in the town. For £350. Only requires seeing. Please apply, 30, Jewry St., Aldgate, City.

NEAR London.—A genuine old established Family and Dispensing BUSINESS to be disposed of at once. Proprietor going into a much larger business. Returns over £500. Profits half. Rent £28. Good opening for Dentistry. None within 3 miles. No opposition. Full particulars may be had on application to J. J. S., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., London, E.C.

GOOD opportunity for beginner with small capital.—A Retail, Dispensing and Prescribing BUSINESS. In a busy thoroughfare. An immediate purchaser required. At valuation for stock and fixtures, or a reasonable offer. Good sized house. Private and back entrance. Plate-glass front. Present proprietor relinquishing the trade. Particulars from J. H. S., 82, Atlantic Rd., Brixton, London, S.W.

PRESCRIBING, Dispensing and light RETAIL. In thriving market town in Midlands. Takings average £8 per week, without assistance. Might be doubled by energetic man. Vendor leaving through bad health. Price £250 for goodwill, stock, fixtures, furniture and garden. Address, DELTA, Messrs. Hearon, Squire & Francis, 5, Coleman St., London.

SNUG Country BUSINESS, near Stockport. No opposition for 2 miles. Excellent opportunity for young man or Branch Business. Best prices obtained. Will do £400 with ease. Stock and fixtures at valuation. House attached. Very low rental. Improving, healthy locality. Principally light Retail and Prescribing. A. GREAVES & SON, Chesterfield.

IMMEDIATELY.—The valuable Stock-in-Trade, Fixtures, Goodwill, &c., of the late Thomas Brooke Senior. The business having been successfully carried on by Mr. Senior for 24 years renders the opening a very desirable one for an active and energetic man. Price £200. Apply, No. 14, Kirkgate, Wakefield.

LONDON, N.—Genuine old established ready-money Retail, Prescribing, and Dispensing BUSINESS, in a good thoroughfare leading to the City. Commanding corner shop, with plate-glass front. Convenient house on lease. Rent £50. No opposition. Returns £500, and can be very much increased by an energetic proprietor. Present one retiring. A surgeon would do well. A good opportunity for adding Dentistry. Full particulars to a bonâ fide purchaser who can command about £450, with a liberal allowance for alterations and improvements. A. H., Messrs. Hewlett & Son, Charlotte St., Great Eastern St.

IN a densely populated district in the neighbourhood of Portsmouth.—A good ready-money BUSINESS. Doing £10 per week. Convenient house, at low rental. Price of goodwill £50. Stock and fixtures at valuation, about £100. An immediate purchaser liberally treated with, as the proprietor is about to retire from the Retail trade. Particulars of T. J. W., 134, Sultan Rd., Landport, Hants.

THOMAS TOMLINSON & SON,

Valuers and Transfer Agents,

MANCHESTER.

DRUG BUSINESSES FOR DISPOSAL:—

Established 14 years, in the pleasantest and most prosperous town in the MIDLAND COUNTIES. Returns £1800. Profits £400. General Retail and DISPENSING. Rent £60. Retiring. Price £1000.

Established 40 years, in one of the best streets of MANCHESTER. Returns about £700. Profits about £300. First-class Retail and DISPENSING. Rent £105, with good house and handsome shop. Valuation about £500. Ill-health.

Established 35 years, in leading thoroughfare in MANCHESTER. Returns now under management £200, easily doubled. Rent £35. Good house, with four bed rooms. Price £65.

An excellent opportunity for a PARTNER in an old established business in the Wholesale, or would be transferred after thorough introduction. Amount required about £1500.

See also advertisement in *Chemist and Druggist* for July for other businesses.

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

HENRY GADD begs to call the special attention of Gentlemen with limited capital at command to several small BUSINESSES which he can offer this week at a very low figure. Profits ranging from £100 to £300 per annum.

Particulars of Businesses returning larger sums on application.

A CAPITAL HOUSE AND SHOP,

SUITABLE for Chemist's Business, to be let, in a S.E. district of London. Densely populated and quite unopposed. With plate-glass shop front. For particulars apply to Mr. SHIPLEY, 92, Jamaica Rd., S.E.

WYE HOUSE ASYLUM, Buxton, Derbyshire, for the Middle and Upper Classes of BOTH SEXES, is beautifully situated in the healthy and bracing climate of the Derbyshire Hills, and is directly accessible by the Midland and London and North Western Railways. For terms and other particulars, address the Resident Physician and Proprietor, Dr. F. K. DICKSON.

WANTED TO PURCHASE.

A GENUINE good-class BUSINESS, in London, or at the sea-side. Returning not less than £1000. Address, DELTA, care of Wilson & Co., 103, Cheapside, E.C. No agents.

A WELL established Chemist's BUSINESS, in or near London. Cash £300 or £400. Must bear the strictest investigation. Send full particulars to M. B., London Institution, Finsbury Circus, E.C.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

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VALUATIONS.—In consequence of the increased demand for Mr. BRETT'S services as a Valuer, it is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

F. J. BRETT has always on his Register between 200 and 300 Businesses in all parts, and at a wide range of prices. No PRINTED REGISTER issued, as experience has proved this to be so objectionable to Vendors.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 632.] SATURDAY, AUGUST 5, 1882. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

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ELIAS BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September. for the usual annual revision, and for repairs.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

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The Society's Rooms will be closed from August 12th to September 11th.

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FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, *as follows:—*

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Thursday, October 5th, 1882. They will comprise the following subjects:—

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2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

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Was *introduced* to the Profession by Messrs. SAVORY & MOORE. The advantage of this (the ORIGINAL) preparation over the imitations of it consists in the ability to administer a SUFFICIENT dose of Phosphorus without the admixture of a LARGE quantity of Cod Liver Oil. Dose, 1 to 2 drachms. Supplied in bulk or small bottles.

PEPTODYN.

A Combination of the whole of the Digestive Secretions—Pepsine, Pancreatine, Diastase, or Ptyalin, &c., forming a valuable remedy in the treatment of all forms of Dyspepsia, and Diseases arising from imperfect nutrition. Dose, 3 to 5 grains.

LIQ. FERRI HYPOPHOSPH. CO.

A Non-Saccharine Substitute for "Chemical Food."
(Dr. FREDERICK CHURCHILL, Victoria Hospital for Children.)

VIN. FERRI HYPOPHOSPH. CO.

(Dr. FREDERICK CHURCHILL, Victoria Hospital for Children.)

Solutions of the Hypophosphites of Iron (Ferrous Salt), Lime, Magnesia, and Soda, obtained without the aid of sugar or strong mineral acids, which have been used with marked success at the above-named Hospital as TONIC, ANTACID, and STOMACHIC REMEDIES—of special value in the treatment of Diseases of Children, and free from the objectionable characteristics of the Saccharine "Chemical Food," and the uncertain composition of "Steel Wines." Vide *British Medical Journal*, March 27, 1880.
Dose—of the Liquor, minims 15 to 60; of the Vinum, 1 to 4 drachms, to be diluted. Supplied in any quantities required.

SAVORY & MOORE,

143, NEW BOND STREET, LONDON, W.

JAMES EPPS & CO.'S

HOMŒOPATHIC MEDICINES

ARE SUPPLIED IN BOTTLES

FULLY LABELLED,

WITH PRINCIPAL USES, DOSE, AND REPETITION.

For Price List send Trade Card to

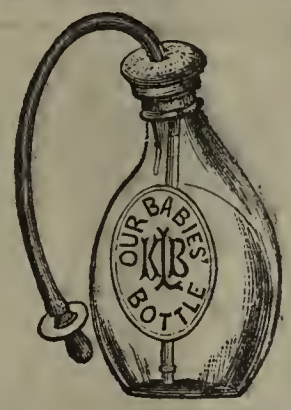
48, THREADNEEDLE STREET.

KILNER BROS., Glass Bottle Manufacturers,

Solicit orders for MEDICAL DISPENSING BOTTLES (Green and White Flint) and other kinds used by Chemists.
Also for their new Feeders. "OUR BABIES' BOTTLE."

(6d. Retail) 36s. 38s. 42s. AND 44s. per Gross.

(1s. Retail) 75s. AND 81s. per Gross.



(1s. 6d. Retail) 108s. AND 120s. per Gross.

Terms and Discounts forwarded on receipt of application stating quantity required. Large buyers liberally treated with. Illustrated Price Lists of all kinds of Bottles on application to KILNER BROTHERS, 10, Great Northern Goods Station, King's Cross, London.

SPRATTS PATENT

Meat "Fibrine" Vegetable DOG CAKES (with Beetroot.)

DOG AND POULTRY MEDICINES AND DOG SOAP.

TO CHEMISTS AND DRUGGISTS.

Transparent Glass Tablets for Medicines and Soap supplied on application, or through Wholesale Houses.

Address "SPRATTS PATENT," Bermondsey, S.E.

Or Order through your Wholesale House.

GREAT SAVING OF MONEY AND LABOUR. **SOMETHING NEW** ELEGANCE AND DURABILITY COMBINED.

PATENT RECESS LABELLED SHOP ROUNDS. Parties about to Open New Establishments or Refit Old Premises, should compare following Net Prices. *These Prices include Glass Labels attached to Bottles ready for use.*

Size.	Height.	Flint Glass. N.M.	Flint Glass. W.M.	Blue Glass. N.M.	Blue Glass. W.M.	
16 ounce	8 inches	16/6	18/6	20/	22/	per dozen.
20 ,,	9 ,,	17/6	20/	21/	23/	,,

Size.	Height.	Flint Glass. N.M.	Flint Glass. W.M.	Blue Glass. N.M.	Blue Glass. W.M.	
32 ounce	10½ inches	20/	22/	22/	26/6	per dozen.
42 ,,	11 ,,	22/	25/6	26/6	30/	,,

Prices of other Shop Bottles, &c., on application. Sample Bottle sent on receipt of 1s. 7d. in stamps. Fac-Simile sheet Labels, in various styles, sent on receipt of two stamps. *Amongst others, the following parties have recently been supplied with these Bottles:—*

Ady, Dr. J. C., Rangoon
Beckwith, H. B., Grenada
Blair, John, Cork
Brevis, John, West Hartlepool
Brumwell, H., Sutton, St. Helens
Brunton, W. W., South Kensington, London
Carruthers & Allan, Dumfries
Catford, O. W., Crewkerne, Somerset
Cullen & Co., South Norwood, London
Cummings Bros., Dundee
Day, J., Savile Town, Dewsbury
Gardner, A. W., Auckland, N.Z.
Gibbs, R. D., Smethwick
Kinninmont, A., Glasgow
Laidlaw, Walter, Denny
Le Brocq, P. D., Jersey
Lonsdale, A. W., Rangoon, Burmah
Macfarlane, A. Y., Edinburgh
Mason, W. D., Grimsby
Maston, G., Hartlepool
McCaul, J. & G., Londonderry
McRae, Alexander, Edinburgh
Morris, J. L., Moss Side, Manchester
Noble, A., Galashiels
Pattison, H., Coleham, Shrewsbury
Quiray, W. D., Belfast
Rand, E., Wagga-Wagga, New South Wales
Senior, Harold, Norwood Lane, London, S.E.
Sibthorpe, S., Wolverhampton
Smith, Albert, Ilfracombe
Taylor, W. G., Hungerford
Walton, M. F., Sowerby Bridge
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Wills & Wootton, Westminster College
Wing, Lewis, Chislehurst
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Wholesale and Export Dealers in

Patent Medicines, Perfumery, Druggists' Sundries, Lozenges, &c.

Catalogues free on receipt of business card.

TRADE

MARK.

OUR PRINCIPLES OF BUSINESS ARE:—

One set of terms for all, and those the best possible.

No deviation in favour of one man in a town as against another.

Correctness and Promptness in execution of Orders.

Every endeavour made to obtain articles not in stock.

489, OXFORD STREET, LONDON, W.

NOTICE.—*Renumbering of Oxford Street. Our number is altered from 252 to 489.*

THE SPECIAL ATTENTION OF THE TRADE IS CALLED TO

BENZINE COLLAS

Which is acknowledged on all hands to be the most reliable Preparation for removing Grease, Oil, Tar, Wax, or Paint from every description of Wearing Apparel or Household Stuffs. It neither injures the colour or texture, nor leaves any odour or stain. It is neatly got up, and is a most saleable article. Observe the word "COLLAS" on label and cap.

1000 HANDBILLS, WITH NAME AND ADDRESS,

Will be printed for any Chemist who gives an order for

£1 WORTH of BENZINE COLLAS,

At the following prices, viz.:—

6d. Size	...	4s. per dozen,	subject to Discount.
1s. Size	...	8s. do.	do.
1s. 6d. Size	...	13s. 6d. do.	do.

Special Quotations to Shippers and large Buyers on application to

J. SANGER & SONS,

489, Oxford Street, London, W.

KEARSLEY'S WIDOW

WELCH'S FEMALE PILLS.

These are universally acknowledged to be the Genuine, and Druggists may safely recommend them.

CAUTION!

The Proprietors of Kearsley's Original Widow Welch's Female Pills find it incumbent on them to caution the purchasers of these Pills against various imitations by parties who have no knowledge of their peculiar preparation, the Original Recipe having been sold to the late G. Kearsley, of Fleet Street, whose Widow found it necessary to make an Affidavit, for the protection of her property, in the year 1798. The Genuine Recipe for **Widow Welch's Female Pills** has been prepared by them for more than **Ninety Years!** Chemists are particularly requested to remark that, as a testimony of authenticity, each bill of directions contains an Affidavit, and bears the signature of "C. KEARSLEY," in writing, also engraved on the Government Stamp, and each box is wrapped in WHITE paper.

1000 HANDBILLS, WITH NAME, AND TWO TIN SHOWCARDS,

Supplied with all Orders for One Dozen (13) Boxes,

PRICE 27s. PER DOZEN,

Subject to usual Discount.

Special Quotations to Shippers and for large quantities, on application to

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Hunyadi János

CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED), LONDON."

E. PLOMER & CO.

Chemists to the Viceroy of India,

SIMLA and LAHORE.

London Agents: Messrs. A. DURANT & CO., 89, Gresham St. E.C.

T. & F. J. TAYLOR'S

AËRATED WATERS, NEWPORT PAGNEL.

ESTABLISHED 1835.

SODA, POTASH, SELTZER, AERATED (without Alkali), and LITHIA WATERS. LEMONADE & GINGER ALE.

Each Bottle is protected by a Label bearing the Signature of the Firm.

Purity and Excellence of the Water certified by Analysis by Professor ATTFIELD, Ph.D., F.C.S.

REGISTERED.

PURE AËRATED WATERS

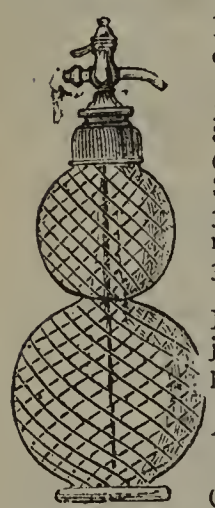
Ellis's Ruthin Waters, CRYSTAL SPRINGS.

Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.

CORKS BRANDED "R. ELLIS & SON, RUTHIN," and every label bears their trade mark. Sold everywhere, and Wholesale of R. ELLIS & SON, Ruthin, North Wales. London Agents: W. BEST & SONS, Henrietta St., Cavendish Sq.

EUGENE GERAUT & CO.'S

New Patent Lever Seltzogenes



For the immediate production of Eau de Vichy, Soda Water, Sparkling Lemonade, Aërated Waters.

3-pint wire, 13s.; 5-pint wire, 18s.; 8-pint wire, 30s.; Cane covered, 3-pint 6d., 5-pint 1s., 8-pint 2s. each extra. Strongly Silver Plated top 5s. ea. ex. 3-pint size, strongly Silver Plated, richly decorated Porcelain Stands, 30s. each.; 5-pint, ditto, 38s. each; 8-pint, ditto, 48s. each.

POWDERS FOR THE ABOVE—subject to alterations, *pro* or *con*—3-pint, per dozen boxes, 22s.; 5-pint ditto, 36s.; 8-pint ditto, 65s.

Large discount for large quantities.

WHOLESALE PRICES FOR SYPHONS.

Clear or coloured glass, viz., red, blue, green, or yellow, warranted pure ENGLISH BLOCK TIN TOPS, with piston or cap, **22s. 6d.** *per dozen or* **£13 10s.** *for quantities of not less than one gross.* PACKING IN CASK 5s. PER GROSS.

The Name marked on the metals free of charge for quantities of not less than one gross. The Name engraved on the glass with Trade Mark, 1s. 6d. and 2s. per dozen extra.

1 & 2, Corporation Bldgs., Farringdon Rd., London, E.C.

TASTELESS PILLS

(COX'S PATENT.)

Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. per pound, coated, as a good general saleable Pill. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1*d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.*

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

NEW HONEY. NEW HONEY.

W. KEMP is now offering NEW PALE HONEY of choice flavour at a remarkably low price, in free packages of different sizes; also in handsome glass jars of 1 lb. each. Samples and quotations free. Also, FRENCH BEESWAX, in bricks of ½ lb. each, and JAMAICA BEESWAX, in 3 lb. cakes, of first-class quality and free from dirt. Samples free.

WM. KEMP, High St., HORNCASTLE.

N.B.—Genuine CRUSHED LINSEED, containing *all* the oil, 18/6 cwt., bag free.

METHYLATED SPIRIT

LICENSED MAKERS

A. & J. WARREN,

WHOLESALE DRUGGISTS,

23 & 24, REDCLIFF STREET, BRISTOL,

Who offer the finest pale steam refined COD LIVER OIL, in original 25 gallon tin-lined casks, and can now supply Rectified Spirits of Wine in quantities of two gallons and upwards.

PURE AËRATED WATERS.

J. H. THOMAS & SONS'

SODA WATER. LEMONADE.
POTASS WATER. LITHIA WATER.
SELTZER WATER. *GINGER ALE.

* *The best Ginger Ale in the Market.*

These Aërated Waters have stood the test for upwards of 50 years, and are second to none for Purity and Quality. Sold by all respectable Chemists, Wine Merchants, Hotels, &c. All Corks are branded "J. H. THOMAS & SONS, Boston." For Terms and Show Cards apply to

J. H. THOMAS & SONS,

Chemists and Wine Merchants, Boston, Lincolnshire.

Friedrichshall

NATURAL BITTER WATER

Owes its great reputation to the happy proportions of its ingredients, which have constituted it an unapproachable and indispensable remedy for Constipation, Indigestion, Obstructions, Piles, Chronic Disorders of the Stomach, Liver and Bowels; Hæmorrhoids, Gravel, Gout, Plethora, Rush of Blood to the Head, Diseases peculiar to Females, Hypochondria, Lassitude, Impurities of the Blood and Skin, Eruptions and Blotches. It improves the appetite, keeps the head clear, the blood cool, but never debilitates. Its efficiency can be proved by the testimony of hundreds of physicians.

THE DIRECTORS OF THE SPRING AT FRIEDRICHSHALL, NEAR HILDBURGHAUSEN,

C. OPPEL & CO.

TO BE HAD OF ALL MINERAL WATER DEALERS AND CHEMISTS THROUGHOUT THE UNITED KINGDOM.

Retail Price—Pint Bottle, 1s.; Quart Bottle, 1s. 6d. Pamphlets on application.

HAY'S GINGER CHAMPAGNE

CAN BE OBTAINED FROM THE SOLE AGENTS,

INGRAM & ROYLE,

119, Queen Victoria Street, London, E.C., & Bath Bridge, Bristol.

THIS SPARKLING, EXHILARATING, and REFRESHING DRINK, while being far more agreeable in bouquet and flavour than the FINEST CHAMPAGNE WINE, is, at the same time, unlike it, FREE from ALCOHOL.

It is strongly recommended both for Juveniles as well as for Adults, as the most wholesome stimulating beverage that has hitherto been introduced, and should be in every household during all seasons of the year.

Retail Price 5s. 6d. per dozen.

"So much does it please the palate, that one feels inclined to open a second bottle after having drunk the first. This is a beverage which the practitioner can safely recommend."—*Medical Times and Gazette.*

"Made by Mr. Hay, of Hull, with his well-known Soluble Essence of Jamaica Ginger, takes rank as a pure, wholesome, stimulating, and non-alcoholic beverage."—*British Medical Journal.*

"An excellent and most agreeable beverage."—*Lancet.*

"Mr. Hay, of Hull, deserves abundant success with his Ginger Champagne. It is an exhilarating wholesome, and very agreeable beverage."—*Chemist and Druggist.*

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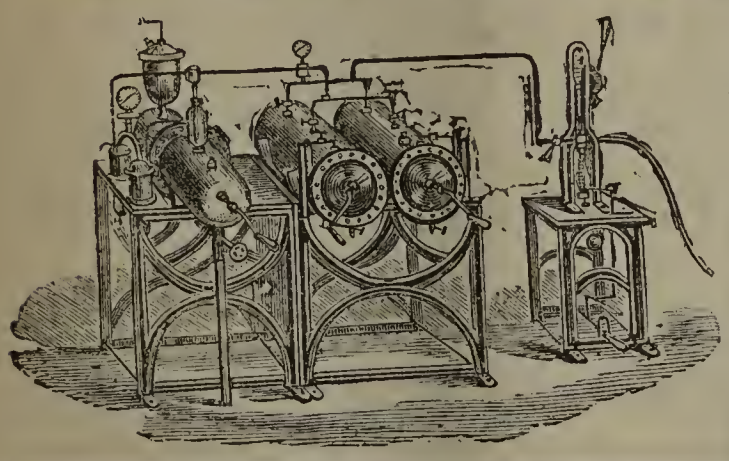
SODA WATER MACHINERY,



Patent Stoppered Bottles,

AND ALL APPLIANCES.

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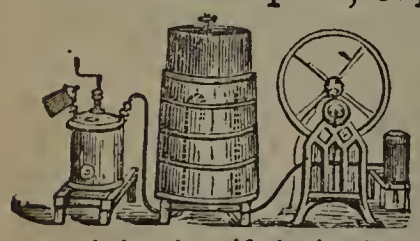
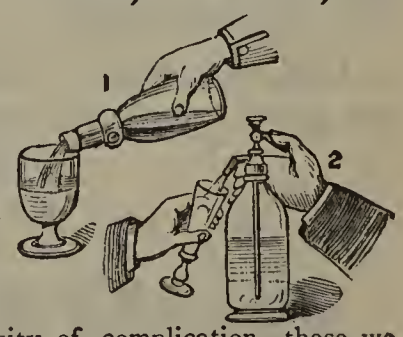
BY

BARNETT & FOSTER, 22n, Forston St., Shepherdess Walk, London, N.

Prize Medals—London, 1862, 1873, 1874; Paris, 1867, 1878; Vienna, Philadelphia, Cape, &c. Highest Award, Sydney, 1879—80.



Our Machines are universally adopted throughout the world for the manufacture of all kinds of Aërated Drinks, whether in bottles, syphons, or counter fountains. There are in England alone over 1,500 factories where our Machinery is in use. They are the simplest, safest, and cheapest for the purpose, and produce a highly-charged gaseous water free from metallic or foreign contamination.



All our Machines have a Gasometer, and it forms a most important necessity where purity of product is required, as in this the gas is expanded and purified; it also removes the possibility of accidents by explosion, and avoids the necessity of complication—these we consider of greater importance than the saving of a few inches of floor space. *Our valuable Book of Recipes and Instructions accompanies every Machine, and the most unskilled can at once produce Waters of the highest class.*

Sole Agents for Codd's Patent Bottle, Fig. 1. Sole Manufacturers of the "London-Made" Syphon, Fig. 2.

PATENTEES OF THE IMPROVED CORKING MACHINE FOR CHAMPAGNE BOTTLES. ILLUSTRATED CATALOGUE FORWARDED FREE.

ALLEN & HANBURYS'

EFFERVESCENT APERIENT SALINE

This is a finely granulated preparation, which in dissolving produces a sustained sparkling effervescence, and a clear, bright solution. It possesses all the advantages of an agreeable saline, combined with the anti-febrile properties of Chlorate of Potash, of which it contains a considerable percentage. It is, in short, an efficient aperient and febrifuge, and makes an exceedingly pleasant and refreshing beverage.

PRICES: THIS SALINE IS SUPPLIED IN BULK AT

1s. 6d. per pound; 1s. 5d. per pound for 14 pounds; 1s. 4d. per pound for 112 pounds; or in ½-pound bottles (to retail at 1s. 6d.) 11s. per doz.

With or without Labels. It is supplied also on the same terms with A. & H.'s own Labels and Wrappers ready for Retail Sale. SAMPLES FREE ON APPLICATION.

MANUFACTURED BY

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EXACT SIZE.

No. 2.

SAUTER'S HOLLOW SUPPOSITORIES,

PREPARED FROM PURE COCOA BUTTER

Accuracy, Cleanliness, Elegance, Facility and Promptitude of Preparation.

PRICES:—Per Box, containing 100 Suppositories, with Stoppers, No. 1, 6/-
Ditto ditto ditto No. 2, 7/-
Ditto ditto ditto No. 3, 8/-

SUBJECT TO USUAL DISCOUNT.

SAUTER, CHEMIST & DRUGGIST, GENEVA (SWITZERLAND).

Inventor and First Manufacturer of Hollow Suppositories.

Depôt:—F. NEWBERY & SONS, 1, King Edward Street, London.

REGISTERED NO. 22149.

INDISPENSABLE IN EVERY LAUNDRY.

Extract from the CHRISTIAN UNION, *May 6th*, 1881.

Mr. HARROP has contrived to produce a *starch gloss* which is more satisfactory and useful for laundry purposes than any other, and in this respect is a decided DESIDERATUM in household economy, *stiffening and polishing the linen with much facility.*

CAUTION.—*Each Packet and Box bears my Registered Trade Mark as annexed.*

Sold in 1d., 3d., 6d., and 1s. Packets, and in large Boxes, for Hotels, Laundries, &c., 5s., 10s., and 20s. each.

May be had Wholesale from S. MAW & SONS, BOURNE & TAYLOR, HODGKINSON, STEAD & TREACHER, and BURGOYNE, BURBIDGES & Co., London, or from the Sole Manufacturer.

MEDALS, LONDON, 1873.] MUMFORD'S [PARIS, 1875.

PURE CRUSHED LINSEED

In 7, 14, 28, 56 lb. and 1 cwt. bags, 20s. per cwt. net, bag included, delivered free in London, and in tins 4s. per doz

Best Quality. No Oil Extracted. Carefully Cleaned and Ground so as to retain the natural colour of the seed without being heated. Samples, Reports, and Analyses on application, post free.

FINEST POWDERED

PURE FULLERS' EARTH

16s. per cwt., in 7, 14, 28, 56 lb. and 1 cwt. Packages. Delivered free in London. *Samples post free.*

GEORGE S. MUMFORD, STEAM MILLS, FARRINGDON ROAD, E.C.

SQUIRE'S

(PARRISH'S)

CHEMICAL FOOD.

[*Syrup. Ferri. Phosph. Comp. (Squire).*]

P. & P. W. SQUIRE, who have for many years been the SOLE AGENTS, have purchased the right and all particulars relating to the manufacture of

PARRISH'S CHEMICAL FOOD,

As prepared by the late Mr. Edward Parrish, of Philadelphia.

This tonic has stood the test of time, having been more generally prescribed for the last 20 years than any other preparation of the kind. It is most peculiarly suited for delicate children, not only from its bone-forming properties and agreeable taste, but also from the fact of its containing no poisonous ingredient, which might interfere with its prolonged administration.

TO DISTINGUISH THIS PREPARATION ORDERS SHOULD BE WRITTEN "SQUIRE'S CHEMICAL FOOD."

SQUIRE, 413, Oxford Street, London.

CORNER OF DUKE STREET, GROSVENOR SQUARE, W.

IMPORTANT NOTICE.

LYNCH'S ENEMAS

(*Nos. 435C and 435D*),

REQUIRING NO METAL MOUNTS.

It having come to our knowledge that an attempt is being made to deter our customers from purchasing and selling the above Enemas, under the pretence that they are an infringement of another Patent, we hereby guarantee all who desire to purchase and sell same against all risks of any kind whatsoever with which they may be so threatened, and will undertake and carry to a conclusion any law proceedings which may be taken against them.

Further, we will esteem it a favour if any of our customers who may be subject to any annoyance of the kind indicated above will communicate at once with us, so that we may be furnished with evidence upon which to take such legal proceedings as will save them from a repetition of the indignity.

LYNCH & CO.

Aldersgate Street, London, E.C.
15th March, 1882.

THE INTERNATIONAL ELECTRIC EXHIBITION.

(*Continued from page* 42.)

Mr. Edison appears to have first begun his experiments in incandescent lighting in the summer of 1878. His earliest efforts were made in the direction of utilizing incandescent platinum wire as a source of light. "He adopted for a lamp a coil of platinum wire, and endeavoured to perfect a regulator of the current which would allow the coil to become luminous without becoming so hot as to melt." The length of platinum wire used in this coil amounted to as much as 17 feet. Great difficulties were met with, owing to the constant tendency to the formation of electric arcs between adjacent portions of the convolutions of the wire, and every time an arc formed the wire disappeared in a shower of sparks. Attempts were therefore made to insulate the wire with some substance that would become luminous when the current was passing. Numerous experiments were also made with wires of other metals, including iridium, and various minerals, but all apparently without the conductor being enclosed in a vacuum. As might have been anticipitated, a saving of the electric energy was found to result, depending on the ascertained fact, that radiation of heat is less across a vacuum than through air. In spite, however, of all precautions and devices, these experiments were a non-success, and after more than a year's laborious and costly experimenting the persevering investigator was unwillingly obliged to admit that he was entirely on a wrong track. The ultimate failure in this direction had been predicted from the outset by electrical experts in this country and in America. To attain economical results an incandescent conductor must have an exceedingly small section and be capable of sustaining an extremely high temperature without volatilizing or fusing, and in this latter respect all known metallic conductors fall far short of the mark. In point of fact, as far as is known at present, some form of amorphous carbon is the only substance that realizes the necessary conditions.

A comparatively small circumstance drew Edison's attention to the possibility of forming a carbon wire or filament. Having occasion to make some carbon buttons for the form of telephone invented by him, he was using a mixture of tar and lampblack for this purpose, when he noticed the facility with which the mixture could be drawn out into strings; this led to experiments which showed that it was possible to form a "carbon wire" from a mixture of this kind. After several weeks' experimenting Edison found that a wire or filament thus formed was capable of lasting for a short time in a vacuum. The key note of ultimate success had been struck and it appeared evident that what was mostly required was increased durability. Attempts were next made to use coils formed from carbonized cotton, thread, twine, etc. The texture of these materials as prepared by Edison was found to be much too loose and tender. Much more satisfactory results were found to accrue from the use of strips of carbonized paper. This material was cut into thin horseshoe shapes, carbonized, and the carbonized slips mounted in glass globes that were afterwards exhausted of air by the Crookes-Sprengel pump. The carbon horseshoes were connected by platinum wire connections with the electrical source. These lamps were found to require about one-eighth of a horse-power each when producing a light of sixteen candles or a little more. In order to see if any injurious effect resulted to the carbon filament by suddenly turning the current on and off, one of Edison's workmen was deputed to turn the current on and off to one lamp. After doing this no less than five thousand times, the lamp was found to have withstood this test without the slightest injury. The durability of the lamp appeared thus certain. A number of lamps thus constructed (something more than forty-five) were apparently found to last when lighted every night nearly a fortnight without showing any signs of breaking down. Patents were taken out for this incandescent paper horseshoe lamp in several countries. Eventually Mr. Edison relinquished the use of paper for the incandescent bridge and settled on the use of carbonized bamboo as the most advantageous incandescing substance.

Students wishing to pursue the manufacture of the Edison lamp further will find a completely illustrated article in *The Electrician* (vol. viii., p. 338); the woodcuts accompanying that article show the original bamboo and all the successive stages of the fabrication of the carbon bridge, also the successive steps by which the enclosing glass globe is prepared for the reception of the carbon bridge. For the purposes of this article it will suffice to give the description by the Incandescent Lamp Committee of the Paris Electrical Exhibition. The jurors' report commences by stating that the lamps in the exhibition, purely incandescent in character, were those of Edison and Maxim in the United States section, and those of Swan and Lane-Fox in that of Great Britain.

"They all consist of a glass envelope more or less spherical in form, in which is enclosed a carbon loop, made of carbonized organic material, and supported upon wires of platinum sealed into the glass. The space in the interior of the lamp is very perfectly exhausted.

"The Edison lamp is pear-shaped in form. The carbon filament is long and fine, and is bent into the shape of a U. It is made from Japanese bamboo, cut to the requisite size in a gauge. In section it is nearly square, being about 0·3 millimetre on a side, the ends being left considerably wider. The fibre is carbonized in moulds of nickel, and is attached to the conducting wires by copper electrolytically deposited upon them."

The committee found the resistance of Edison's lamp, cold, to range from 233 ohms to 268. Ten different lamps were taken, the mean resistance of the ten being 241 ohms. The resistance of the lamps when hot and giving a light of sixteen candles was found to be 137·4 ohms (mean); when giving thirty-two candles, 130·03 ohms. The resistance of carbon decreases with rise of temperature, carbon not following the same law as metals. Hence this decrease of resistance when heated is common to all incandescent carbon lamps.

From the committee's report it would appear that Edison's incandescent lamp is more economical than its rivals, both in point of electrical energy and in candles yielded per horse-power. This economy holds good both when yielding sixteen and thirty-two candles luminous intensity. A current of 0·651 ampères, with an electromotive force of 89·11 volts, was found to be passing when yielding a light of sixteen candles; these numbers representing 196·4

candles per horse-power of energy, or 12·28 lamps of sixteen candles per horse-power. At thirty-two candles a current of 0·7585 ampères and an electromotive force of 98·39 volts was recorded, giving three hundred and seven candles per horse-power or 9·6 thirty-two candle lamps for each horse-power expended.

The Edison exhibit at the Crystal Palace was one of the great sights of the show, the salient feature being an immense pyramidal electrolier of hammered brass, 15 feet high, representing a basket of flowers. This costly piece of work was designed and executed by Messrs. Verity and Sons, of Covent Garden. The electrolier contained some three hundred and fifty represented flowers, ninety-nine of which carried incandescent lamps on three circuits, either of which could be turned off or on without disturbing the rest. This magnificent example of the art of the brass-smith was greatly admired by the crowds of visitors to the exhibition, and was commented on in glowing terms in the columns of the daily press.

The next incandescent lamp to be referred to is the invention of an Englishman and a pharmacist, Mr. J. W. Swan, of Newcastle-upon-Tyne. Though Mr. Swan's patent for an incandescent lamp using a carbon filament in a vacuum is scarcely two years old, it appears that he nearly anticipated the present lamp some twenty years ago. The story had better be given in his own words. It forms the important exception alluded to on p. 42:—

"As a matter of history, I will briefly describe an experiment which I tried about twenty years ago.

"I had a number of pieces of paper and card of various forms and sizes buried in charcoal in a crucible. This crucible I sent to be heated white hot in one of the pottery kilns belonging to Mr. Wallace, of Forth Banks. From the pieces of carbonized card which I thus obtained I selected a long spiral; the ends of this I clipped between small blocks of carbon carried by uprights and connected with conducting wires. A small glass shade was cemented over this mounted carbon spiral, and the air was exhausted by means of a very good air-pump, lent to me for the purpose of this experiment by the Rev. Robert Green, of Longhorsley. A good vacuum (according to the ideas that then prevailed) having been produced, I applied the wires of my battery (consisting of ten cells of Callan's modification of Grove's battery) with great expectation of a brilliant result; instead of this, there was the most absolute negative presented to me, not a vestige of heat or light appeared in my long ringlet of carbonized paper. It was evident, and I immediately recognized the fact, that an electric current of the strength I was using would not go in sufficient quantity through so long a piece of carbon as I had taken. I therefore repeated the experiment with shorter carbon and a greater number of cells, and I obtained, under these altered circumstances, an extremely interesting result.

"My carbon was in the form of an arch, about 1 inch high and ¼ of an inch wide. The ends of the arch were held in small clamps with small blocks of carbon.

"The air-pump having been worked, I had the pleasure of seeing that when contact with the battery of forty or fifty cells was completed my carbonized paper arch became red hot, and it was evident that nothing more was wanted than a still stronger current to make it give out a brilliant light; but I had used up all the battery power at my disposal, and having reached this limit, I contented myself with watching the behaviour of the arch, the engrossing question being, How long will it endure?

"I noticed that the inner part of the arch was hotter than the outer part, and that, perhaps in consequence of this, the arch became bent on one side. This bending gradually increased, until at last the arch had so far curled down that the top was on a level with the clamps, and on coming into contact with the sole of the lamp it broke in two, and the experiment collapsed.

"That, I confidently believe, was the very first instance in which carbonized paper was ever used in the construction of an incandescent electric lamp."

Mr. Swan's experiments had been mentioned by Mr. Barnard Proctor nine months previously, in a letter to this Journal, which will be found in vol. x., page 600. It will be seen, therefore, from these statements that Mr. Swan must be accredited with a large share of priority in this important matter. The Paris committee thus describe the present form of the lamp:—"The Swan lamp is globular in form, the neck being quite long. The carbon filament is made from cotton thread, parchmentized before carbonization by treatment with strong sulphuric acid. The ends of this filament are very much thickened, and the loop has a double turn at the top. Its ends are clamped in a pair of metal holders, supported laterally by a stem of glass, which rises through the neck to the base of the globe. Below, these holders are fastened to wires of platinum, which pass through the glass." It may be added that Mr. Swan has patented a method of depositing carbon from hydrocarbon vapour on the junction of the metal holder and the filament. The parts of the bridge or filament on which the deposit is not to take place are electrotyped with copper. The resistance of the lamp (cold) was found by the committee to range from 74 to 39 ohms, the mean of ten lamps being 59 ohms. The hot resistance at sixteen candles was 32·78 ohms mean; at thirty-two candles, 31·75 ohms mean. The current required per lamp at sixteen candles was 1·471 ampères; at thirty-two candles, 1·758 ampères; the electromotive force in the first case was 47·3 volts, in the latter, 54·21 volts. These figures give 10·71 sixteen candle lamps, and 7·9 thirty-two candle lamps per horse-power, or 177·92 candles in the first case, and 252·4 candles per horse-power in the latter. The Swan lamp has found great favour wherever seen; the light is extremely mellow and pleasant to the eye and the lamp is now produced comparatively cheaply. Swan lamps have been introduced into the saloons of a number of ocean-going steamships, where they have very successfully replaced the paraffin lamps previously used.

Perhaps the most important and useful application that has ever been made of any incandescent lamp is the installation of Swan lamps in the Risca Colliery, a fiery mine in the South Wales district. The seam of coal worked at this colliery has an exceedingly evil reputation as regards the danger involved in getting it. It is hoped that the strongly protected Swan lamps, and the thoughtful and ingenious manner in which the necessary contacts and conductors have been arranged, will go a long way towards the prevention of the dangerous explosions that have occurred at this colliery. The experiment is one which will be watched with great interest by scientific men and by all who are interested in protecting the lives of our colliers,—and who is not?—while they are following their perilous labours in the depths of the earth.

The Swan lamp was well represented at the Crystal Palace, but no attempt was made by the Swan Company to imitate the grand surroundings of other exhibitors.

(*To be continued.*)

SOLUBLE SALTS OF CAFFEINE.*

BY C. TANRET.

Hitherto, in consequence of its slight solubility, caffeine has been administered hypodermically only in very small doses; in fact, at the ordinary temperature, it requires 93 parts of water to dissolve it, so that a cubic centimetre would contain scarcely more than a centigram. Most of the salts of caffeine mentioned in therapeutical works do not exist, and those that do cannot be employed, because upon being dissolved they are decomposed into acid and caffeine, the latter being precipitated if the water is not in the proportion required for the solution of the free alkaloid.

The alkaloidal properties of caffeine are extremely weak; it is perfectly neutral in its behaviour towards litmus, while the ordinary reagents for alkaloids do not precipitate it unless its solutions are relatively very strong. Not being alkaline, caffeine is incapable of saturating the smallest quantity of acid, and although it forms salts with certain acids these salts are far from being as stable as those of most of the other alkaloids, as will be seen upon considering its behaviour with the acids most frequently employed.

Acetic acid dissolves caffeine freely. If this solution be allowed to evaporate spontaneously the acid volatilizes entirely and there remains, not a salt of caffeine, but pure caffeine. An acetate of caffeine, therefore, does not exist.

Neither does valerianic acid form with it a valerianate of caffeine. If caffeine be saturated hot with a very strong solution of this acid, upon cooling it will deposit, not valerianate of caffeine, but simply caffeine, entirely soluble in chloroform and only retaining mechanically traces of the acid, sufficient to impart the odour. The acid titrate of the solution remains the same as before the addition of the caffeine, which proves clearly that the caffeine has not carried down with it a sensible quantity of the acid in its precipitation. Also when caffeine and valerianic acid are placed together under a bell glass, as in the preparation of valerianate of ammonia, the caffeine only becomes impregnated with the odour of the acid. I have verified this fact upon commercial "valerianate of caffeine" occurring in fine crystalline needles resembling those of caffeine, a character that was very natural, since it was only caffeine with a valerianic odour. Exposure to the air and simply washing removed this odour.

Lactic acid does not combine with caffeine to form a lactate. Syrupy lactic acid, saturated in the cold with caffeine, remains syrupy indefinitely; and as in the case of valerianic acid, pure caffeine crystallizes out upon the cooling of a lactic acid solution that has been saturated while hot.

It is the same with citric acid, which does not give a citrate. The product which is decorated with this name is only a mixture of caffeine and acid.

Another circumstance, goes to prove further the non-existence of these pretended salts of caffeine and organic acids. Whilst, for example, citric acid, which is tribasic, requires for the formation of citrates three equivalents of base, one or two of which can be replaced by one or two equivalents of water, there is required to effect the solution of one equivalent of caffeine in water a quantity of acid represented in weight by about three equivalents of acid. The relations are, therefore, precisely the inverse of those which should obtain in the formation of a citrate. To sum up, organic acids do not form definite salts with caffeine. They augment, it is true, its solubility in water, but without combining with it, and since the acidity of the acids is in no way modified by caffeine, it will be evident that with solutions of caffeine in organic acids there would be injected a quantity of free acid several times the weight of the dissolved caffeine.

With mineral acids the conditions are different. Sulphuric acid forms with caffeine a sulphate that crystallizes with difficulty. Hydrochloric and hydrobromic acids on the contrary form salts that are easily obtainable in very fine crystals. These salts are perfectly definite and have been described; but they are not stable, and water decomposes them into free acid and caffeine, which precipitates or not according to the quantity of water employed. They are also altered by the air, and the crystals of the hydrochlorate when exposed effloresce rapidly, losing their acid. After a time, more or less long, according to the temperature, nothing remains but caffeine. Therefore, from this point of view, the salts of caffeine formed with mineral acids do not present any advantage over pure caffeine.

In presence of these negative results, I had the idea of employing the natural salt which holds the caffeine in combination in coffee, the chlorogenate of potash and caffeine of Payen. But that salt is very difficult to obtain in any considerable quantity, and this presents an obstacle to its employment in the ordinary way, besides which when in solution the salt is very alterable in the air. Moreover it contains only 29 per cent. of caffeine, and in the cold requires to dissolve it several times its weight of water, which gives solutions still less charged with caffeine.

It occurred to me then, in view of the apparent similarity that exists between chlorogenic or caffetannic acid and benzoic, cinnamic and salicylic acids, that double salts analogous to Payen's salt could be formed with the three last-named acids, and my conjecture proved correct.

In presence of benzoate, cinnamate or salicylate of soda caffeine dissolves in a very small quantity of water and forms thus very soluble double salts that are very rich in quinine. That there is in this case more than a simple solution is proved by the fact that for a definite weight of caffeine there is required a definite weight of the alkaline salt; in other words, combination takes place according to the equivalents of these various bodies. But this combination is rather weak, since if the salts be treated with chloroform they give up to it all their caffeine. In my opinion these double salts may be best compared with hydrated salts, which lose their water of crystallization when treated with a neutral liquid in which water is soluble. In this way blue sulphate of copper loses its water of crystallization and becomes white when immersed in absolute alcohol.

Cinnamate of soda dissolves caffeine in water equivalent for equivalent, 170 parts of cinnamate for 244 of caffeine. The double salt thus obtained contains 58·9 per cent. of caffeine.

Benzoate of soda and caffeine contains for two equivalents of benzoate of soda (288), one equivalent of caffeine (244), or 48·5 per cent. of caffeine.

The double salt richest in caffeine can be obtained with salicylic acid. An equivalent of salicylate of soda (160) allows of the solution of an equivalent of caffeine (244), which gives 61 per cent. of caffeine in this double salt.

The solubility of these double salts is such that solutions can be easily obtained with the benzoate and cinnamate of soda containing 20 centigrams per cubic centimetre, and with salicylate of soda as much as 30 centigrams.

Benzoic, cinnamic and salicylic acids having supplied me with what I was in search of, I have not thought it necessary to ascertain to what extent analogous results might be obtained by employing these acids in combination with other bases than soda. I may mention, however, that I have been able to obtain double salts with acetic, lactic, citric, sulphuric and hydrochloric acids.

With these new salts, therefore, it will be possible in future to administer caffeine hypodermically. It is true that the alkaline salts associated with it have their own peculiar action; but this action is known, and consequently it will, according to the case and the dose, sometimes be ignored and sometimes taken account of; that will be a matter of therapeutics.

* *Journal de Pharmacie*, [5], v., 591.

In conclusion, these salts may always be prepared extemporaneously by simple solution in water in the proportions given above. But since the commercial benzoate of soda has sometimes an alkaline reaction, it will be as well, in preparing hypodermic injections, to first neutralize the soda salts with the corresponding acids.

EFFECT OF VARIOUS ANTISEPTICS UPON MORBIFIC GERMS.*

Actual experiment with morbific germs is the only way of acquiring definite knowledge on the value of disinfectants. Moreover, there is reason to believe that there are vast differences in the power of resistance possessed by germs of different kinds, so that it cannot be assumed that the results obtained with one are true of another. More facts are still needed, and we note therefore, with interest, a series of experiments which have been made at Lyons by Arloing, Cornevin and Thomas, on the influence of various disinfecting agents on the virus of symptomatic anthrax. The results have been published in the *Lyons Médicale.* If pulp from the tumours in this disease is allowed to dry slowly at a temperature of 35° C., a residue is obtained in which the organisms of anthrax retain their full activity. A few cubic centimetres of water, through which a little of the residue is diffused, has a virulence not inferior to that possessed by the fresh virus, and which continues for at least two years. The experiments on the influence of disinfectants were carried out with this dried virus, and also with perfectly fresh virus. It was found that the resisting power of the former is much greater than is that of the latter. Whatever destroys the dried is capable of destroying also the fresh virus, while the converse is not true. The different substances tested were left in contact with the virus for forty-eight hours, and the test of virulence was the hypodermic injection of five drops. The following substances were found to have no action even upon the fresh virus: alcohol saturated with camphor or with carbolic acid, glycerine, ammonia, acetate and sulphate of ammonia and sulphate of ammonium, benzine, a saturated solution of chloride of sodium, quicklime and lime water, polysulphide of calcium, a one-in-five solution of chloride of manganese, a one-in-five solution of sulphate of iron, a one-in-five solution of borate of soda, a one-in-five solution of tannic acid, a one-in-ten solution of sulphate of quinine, a one-half solution of hyposulphite of soda, essence of turpentine, and monobromide of camphor; of gases, ammonia, sulphurous acid, and chloroform. A saturated solution of oxalic acid, a one-in-twenty solution of permanganate of potash, a one-in-five solution of soda, vapour of chlorine, and of sulphide of carbon destroyed the activity of the fresh virus, but had no effect on that which had been dried, while the activity of the latter was destroyed only by solutions of carbolic acid (2 per cent.), salicylic acid (1 in 1000), nitrate of silver (1 in 1000), sulphate of copper (1 in 5), boric acid (1 in 5), saturated salicylic alcohol, corrosive sublimate (1 in 5000), and bromine vapour.

Thus many substances unanimously regarded as antiseptics were without effect upon the virus, even in the fresh state. Pure or camphorated alcohol is largely used by surgeons in France to wash their instruments, but is evidently capable of giving only an illusory safety against morbid germs. Quicklime, in which it is often recommended that the bodies of animals dying of anthrax should be buried, and with which the walls of infected places are washed, is no better. At the moment of its hydration some organisms are probably destroyed by the heat which is disengaged, but those which are not in immediate contact with the lime seem to have preserved all their activity. Very thin layers of the tissue of the tumours of anthrax were taken and rolled up and plunged into the quicklime, and left in it for forty-eight hours. At the end of that time they were rubbed up with water, and the liquid was found to possess full virulence. The inutility of tannic acid suggests the question whether tanning is really adequate to destroy the poison in the hides of the affected animals, and it is clear that salting has no influence on the virus contained in the flesh, etc. Quinine, so powerful in the paludal diseases, which are now believed to be due to organisms, was found to have no influence over the bacteria of anthrax. Ammonia and its compounds were also powerless. Ammoniacal fermentation, therefore, which is said to destroy some bacteria, does not influence those of anthrax. Sulphate of iron and chloride of manganese, substances which have been strongly recommended as disinfectants, were equally powerless. Further, the sulphurous acid, which is so potent in action upon some parasites of high organization, and on many forms of virus, has no influence on the bacteria of symptomatic anthrax. Chlorine and sulphide of carbon, which destroy the fresh virus, are powerless against that which has been dried. Of all the vapours bromine is the only one which seems to offer complete security. Another important result, from a surgical point of view, is the action of carbolic acid. A 2 per cent. aqueous solution destroys the activity of the dry virus, but all the power is lost if the carbolic acid is mixed with alcohol. This fact has already been noted by Koch with regard to other kinds of spores. On the other hand, salicylic acid mixed with alcohol preserves its power. Turpentine, recommended by Pasteur, for the purpose of destroying the bacillus of true anthrax, has no influence on that of symptomatic anthrax. At the head of the efficient agents stands corrosive sublimate, of which a solution of 1 in 5000 is sufficient; next come in order nitrate of silver, salicylic acid, and carbolic acid. A 2 per cent. solution of the latter was found, however, only to destroy the organisms when it had been in contact with them for eight hours in the case of the fresh virus, and for twenty hours in the case of that which had been dried.

The practical deductions from these experiments are obvious, and are of the highest importance. So far as their use against symptomatic anthrax is concerned, the choice of agents to destroy the fresh virus in stables, etc., is a wide one. That for the dried virus, however, is more limited; only the bromine vapour can be regarded as affording complete security. For washing down places the most efficient agent, corrosive sublimate, is rather dangerous. Solutions of sulphate of copper, carbolic acid (2 per cent.), or salicylic acid (0·1 per cent.) are recommended. For the effectual disinfection of carcases, however, no agent should be trusted but combustion; but if this is impossible it should be cut deeply and treated with corrosive sublimate, sulphate of copper, or carbolic acid.

Practitioners of veterinary medicine have the great advantage of being able to bring these questions to the test of experiment much more perfectly than is possible with regard to many of the diseases of man. It would be extremely important, for instance, to have a similar series of experiments as to the influence of the various disinfectants on the virus of scarlet fever and other maladies which are not transmissible to the lower animals. Too little regard has certainly been paid to the differences possessed by different germs in their capacity of resistance, and the results obtained in the case of one have been applied too freely to all.

* From the *Lancet.*

OCCURRENCE OF BASSORA GUM IN CYCADEÆ.*

BY C. R. BLACKETT.

Baron von Mueller, the Government botanist, in the course of his scientific researches upon some hitherto undefined species of cycadaceous plants, being anxious

* From the Australian Supplement to the *Chemist and Druggist*, May, 1882.

to examine the gum exuded by *Macrozamia Fraseri*, collected by Mr. John Forrest, the Australian explorer, and *Macrozamia Miguelli*, procured by the Rev. Dr. Wools, requested me to make an examination as to the character of this gum.

It would seem that hitherto it has not been recorded that a kind of gum is exuded by cycadaceous plants, although the abundance of a peculiar starch in the stems of the Australian Macrozamias has been noticed in various publications, and also in the pages of the *Chemist and Druggist* by Baron von Müeller. This gum is similar to Bassora and cherry gum, is secreted both from the stem and fruit-cones of the Macrozamias; in general appearance it is not unlike gum acaciæ, it is very tough and of a brownish colour. In the experiments upon these gums from *M. Fraseri* and *M. Miguelli*, it was found that they were with difficulty fractured, and swell up and soften on being macerated in cold water, becoming transparent gelatinous masses, and not rapidly dissolving; by long-continued digestion in boiling water, the less soluble matter is gradually brought into solution; the clear solution dried at 100° C. forms a clear and hard gum, adhesive to the touch of the slightly moistened finger. The addition of potassic hydrate renders the gum readily soluble, but darkens the colour considerably. In water, acidulated with H_2SO_4 it is soon dissolved, and a flocculent precipitate is formed, and after boiling for a short time the presence of sugar was detected on the addition of Fehling's copper test; absolute alcohol produced only a slight turbidity in the watery solution. The latter will keep undecomposed for several days, and dries up very slowly; therefore, this gum, even if more adhesive, could not be used as a substitute for gum arabic. Ferric chloride produces no action upon the solution whatever. The ash yielded was found to be equal to 1·75 per cent., and composed of lime, iron, sodium, potassium, carbonic acid, sulphuric acid and chlorine.

This gum is therefore analogous to Bassora gum, or tragacanth, and similar gummous exudations of plants; whether it can be used instead of gum tragacanth has yet to be tried. This gum was not found to possess any of the deleterious acridity which pervades the sap of the cycads generally, and which renders their fruit, in a raw state, poisonous. Since writing the above, I find that Dr. Pereira, in his 'Materia Medica,' p. 288, vol. iii., under Cycas, says—"A clear mucilage, which converts into a gum-like tragacanth, exudes from fresh wounded plants of several species of cycas."

Gum of Bassora, which appears to be the produce of a cactus, is white and honey-coloured, mealy, and silvery on its surface, and in the form of somewhat flattened and elongated masses. It is insipid, and crackles between the teeth. In water it swells up to a transparent jelly, but only a small portion dissolves. The soluble portion contains arabin, amounting to about 1 per cent. of the gum; the insoluble portion contains bassorin. It dissolves with the aid of heat in potash and weak acid.—'Watts's Dictionary,' p. 955.

Baron von Müeller informs me that he has "just obtained a specimen of gum from *Brachychiton ramiflorum*, which behaves like the bassorin gum of the Cycadeæ." He also says:—"In my travels I have noticed gummous exudations from all the brachychitons and sterculias in Australia, including the famous 'bottle-trees,' and I have no doubt that the gum of the various sterculia trees of the tropics of Asia, Africa and America consists of bassorin, one species from Western Africa being described by Professor Lindley as *Sterculia tragacantha*, on account of the tragacanth-like gum exuding from its stem and branches. Whether by chemical action this bassorin gum can be turned to important practical uses has yet to be seen."

THE PURIFICATION OF COMMERCIAL ALCOHOL.*

BY A. RICHE.

It is known that in fermentation sugar does not split up exclusively into alcohol and carbonic anhydride, according to the equation of Gay-Lussac, and Pasteur has shown that glycerine and succinic acid are constantly formed during the alcoholic fermentation. Many others besides these four products make their appearance at the same time, several of which are not yet defined, but mention may be made of most of the alcohols and acids of the fatty series; the aldehydes, their isomers and various derivatives; and isopropylic acid.

Alcohol is now manufactured from the most varied materials: fresh and dried grapes; beetroot and beetroot molasses; various grains, such as barley, rye, maize and rice; saccharine fruits, as figs, dates, plums, and mulberries; and several starches. Some of the bodies contaminating commercial alcohol are derived from the material used as the source of the alcohol, and are only met with if the alcohol is derived from a particular material.

The temperature to which the fermented liquor is subjected in the distillatory columns also determines the formation of contaminating products, and notably of substances possessing a disagreeable odour and taste; so that the number of compounds affecting the purity of alcohol is very large and very diverse in nature. In weight they only represent a very small portion of the alcohol, but this quantity is nevertheless sufficient not only to give the alcohol a special flavour, but also to render it more injurious for consumption than pure vinic alcohol.

It is therefore very important to free the alcohol from these impurities. At first it was hoped that this could be done by several rectifications, and M. Pierre effected it by frequently repeated operations conducted at the lowest possible temperature. But on a manufacturing scale this is impracticable, because the distillatory columns are heated strongly and for a long time, so as not to leave any alcohol in the residues: at most one third of the product would be alcohol of good flavour, and that would be still far from pure.

At the commencement of the distillation the first runnings consist of alcohol having a bad flavour (*mauvais goût du tête*), due especially to aldehydes and alcohols; then the runnings become less impure (*moyen goût de tête*). Alcohol of good flavour is collected towards the middle of the operation, and the remainder constitutes the last runnings (*moyen goût de queue* and *mauvais goût de queue*), which contain the higher alcohols and empyreumatic oils.

Attempts have been made to purify the alcohol by means of wood and animal charcoal, but with very imperfect results. Oxidation both by treatment with various oxidizing bodies, and by the action of a current of air has also been tried, but with indifferent success, in consequence of the loss of alcohol. Considering the fact that the most active and odorous of the contaminating compounds are aldehydes,—vinic, butylic, amylic, etc.,—M. Naudin conceived the idea of getting rid of them by a process of hydrogenation, and this he has carried out practically by means of the copper-zinc couple.

If a plate of zinc be immersed in a solution of a salt of copper it becomes covered with a metallic deposit, and eventually constitutes a true copper-zinc couple, in which the copper exists in a finely divided state. Thus prepared the couple is capable of decomposing pure water, with evolution of hydrogen and formation of hydrate of zinc. It can consequently act freely in neutral liquids and constitutes a powerful agent of hydrogenation. If an alcoholic distillate indicating 40 to 65 alcohometric degrees be brought into contact with such a couple in action it is found that the hydrogen evolved is absorbed

* Abstract of a paper in the *Journal de Pharmacie*, [5], v., 480.

and that the odour and taste of the distillate disappear rather rapidly. The distillates of maize and beet molasses thus hydrogenated, when rectified in the ordinary apparatus, show an augmentation of 25 to 30 per cent. of good flavoured alcohol over the old yields.

In the apparatus of M. Naudin zinc cuttings are placed in successive beds of 15 to 20 centimetres in thickness, supported on wooden diaphragms pierced with holes in a vat made of wood, copper, or iron. At the commencement of the operation a sufficient quantity of 5 per cent. solution of sulphate of copper is run into the vat. The decoloration of the cupric solution marks the completion of the precipitation of the copper in a pulverulent state upon the zinc cuttings, and the couple is then ready for work. The resulting solution of sulphate of zinc is run off, and the vat is filled with the distillate to be purified.

By a special arrangement, the alcohol is kept circulating in the vat, but the time required for it to remain in contact with the couple is not always the same. This necessarily depends upon the degree of contamination in the product to be purified, the temperature at which the hydrogenation takes place, and the condition of the couple. Temperature, especially, has a considerable influence upon the rapidity of the reaction; for instance, a sheet of zinc covered with precipitated copper gave in one hour at 2·2° C. 1·2 c.c. of hydrogen, and at 98° C. in the same time 528 c.c. The temperature of the liquor in the vat is controlled by a worm through which hot water or steam can be passed. When the hydrogenation is completed, the distillate is passed on to the rectifying column.

The hydrogenating action of metallic couples is generally sufficient for the entire purification of the distillate, and in the case of distillates from grain and beet molasses, the increase in the yield of good flavoured alcohol in the first runnings is 25 to 30 per cent.

But this treatment, although sufficient for many distillates, does not sufficiently improve those obtained directly from beet, and in these cases M. Naudin completes the action by electrolysis by means of electric machines. The distillate from the beet is first left in contact with the copper-zinc couple a sufficient time (two days or more) to ensure its complete hydrogenation and then, nearly purified but having still a slight flavour of its origin, it is acidulated by means of sulphuric acid and sent into a special arrangement of voltameters. The number of voltameters coupled varies with the intensity of the action required, and the quantity of distillate to be purified. In practice, in a factory running 6000 or 7000 gallons daily, twelve voltameters are in couple, and the electrolytic action is regulated by disconnecting or placing in circuit the required number. It is evident that in this operation there must be some oxidizing action, and to this extent it would appear to be open to the same objection as the processes based upon oxidation.

M. Pictet has recently announced that he effects the purification of alcohol by rectification carried on at a low temperature, and that this operation is carried on in a large scale in Paris. The distillates, or even the musts, are placed in a large boiler surmounted by a rectification column, above which rises a condenser surrounded with cold water, which condenses the less volatile products so that they run back into the boiler. The vapour not condensed here, passes into a refrigerator, surrounded with cold water, where they are completely condensed. The first runnings (*goûts de tête*) are collected in a receiver; next comes the good flavoured alcohol, which is then run into a second boiler.

The first still is connected with an air pump, by which a more or less complete vacuum can be produced, and the temperature thus regulated. In the second still a nearly complete vacuum is produced, so that the temperature falls quickly. The vapour which issues from it consists of nearly pure alcohol, because the few foreign bodies which pass into the first distillation do not give off vapour at the temperatures, varying between – 10° and 5°, which obtain in this part of the apparatus.

The vapour of alcohol thus purified rises into a second rectification column, terminated by a refrigerator cooled by liquid sulphurous anhydride, in which is maintained a temperature between – 25° and – 50°. The first portion is collected in a special vessel and withdrawn; the remainder is pure alcohol.

IS GELSEMIC ACID IDENTICAL WITH ÆSCULIN? WITH OBSERVATIONS ON THE PREPARATION, PROPERTIES AND RECOVERY, WHEN ABSORBED, OF THE IMPORTANT CONSTITUENTS OF GELSEMIUM SEMPERVIRENS, AND GELSEMIUM POISONING.*

BY THEODORE G. WORMLEY, M.D.,

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In the *American Journal of Pharmacy* (Jan., 1870) the writer announced that *Gelsemium Sempervirens* contained a non-nitrogenized principle, of an acid reaction, which was named *gelseminic*, or *gelsemic* acid; and also a strongly basic principle, which was named *gelsemia*, or *gelsemine*.

From a subsequent examination of the constituents of the plant, M. Sonnenschein and Charles Robbins concluded that the so-called *gelsemic acid* was identical in properties and composition with the glucoside *æsculin*, found in the bark of the horse-chestnut, and certain other barks (*Ber. der Deut. Ges.*, Sept. 1876, 1182).

Before examining this question of claimed identity, the method, of several employed, which we have more recently found the most satisfactory for the extraction of the two important constituents of the plant, will briefly be given.

Preparation.—100 grams of the powdered dry root are macerated for two days in 400 c.c. of a mixture of equal parts of water and alcohol of ·815, the mixture being slightly acidulated with acetic acid and occasionally warmed and agitated. The liquid is strained through muslin, and the solids well washed with water containing a little alcohol, the washings being collected with the first liquid. The whole is evaporated to about 200 c.c., and allowed to stand until the resinous matter has deposited. The liquid is then filtered, concentrated to about 80 c.c., and, if necessary, again filtered.

1. *The non-nitrogenized principle.*—This is extracted from the concentrated liquid, while it still has an acid reaction, by ether, in the usual manner, using three or four volumes of the liquid in two or three portions.

The crystals obtained on evaporation of the ether are washed with a little absolute alcohol, which readily dissolves the adhering colouring matter. The residue may be further purified by a second extraction by ether.

A very good method of purifying the substance, especially from the last traces of the alkaloid, is to dissolve it in about 250 parts of water, by the aid of a few drops of ammonia, and then treat the clear solution with diluted hydrochloric acid, added drop by drop until the point of neutralization is almost, but not fully, reached, taking care that the first cloudiness or precipitate produced has fully crystallized before adding another drop of the acid. The crystals are collected on a small filter and washed with a little cold water.

2. *Gelsemine.*—The liquid from which the former principle is extracted was gently warmed until the dissolved ether has been expelled. It is then rendered slightly alkaline by sodium hydrate or carbonate, and the liberated base extracted by ether, which is allowed to evaporate spontaneously.

The impure alkaloid thus obtained is dissolved by the aid of a few drops of hydrochloric acid in about 12 c.c. water, the solution filtered, and the filtrate treated with a very slight excess of sodium hydrate, when a large portion of the alkaloid will separate as a pure white

* From *The American Journal of Pharmacy*, July, 1882.

precipitate. This is quickly collected on a filter and washed with pure water. The remaining portion of the alkaloid is extracted from the filtrate by ether or chloroform.

From the dried root of the plant we obtained, after this manner, ·25 per cent. of gelsemine and ·50 per cent. of the acid principle.

Is Gelsemic Acid Identical with Æsculin?

For the purpose of answering this question various samples of the gelsemium principle were examined comparatively with a sample of *æsculin* prepared by E. Merck, of Darmstadt. It consisted of a spongy, sparkling white mass of minute (microscopic) needles and prisms. On comparing it with a somewhat coloured preparation obtained from horse-chestnut bark, the substances presented essentially the same properties in the several respects examined.

This comparative examination showed:

A. These principles agree more or less in the following respects:

1. Both substances are readily soluble in the *caustic alkalies*, forming solutions which have a yellow colour by transmitted, and appear blue by reflected light, the fluorescence appearing in both instances, even in very highly dilute solutions, being distinctly marked in a 100,000th solution.

The fluorescence of the gelsemium principle, however, is *greenish blue*, whilst that of æsculin is deep *sky blue*. The fluorescence in both instances is destroyed by free acids.

2. *Nitric acid* dissolves both substances with a yellow colour, and the solutions, when treated with excess of ammonia, assume a deep red colour. This red coloration may be obtained from even the $\frac{1}{50000}$ of a grain of either substance.

The nitric acid solution of the gelsemium principle, when present in sufficient quantity, has an orange-red colour, whereas that of æsculin is yellow.

B. They differ more or less in the following properties:—

1. *Crystallization.*—The gelsemium compound very readily assumes the crystalline form, even in the presence of comparatively large proportions of resinous matter, whereas *æsculin* crystallizes with some difficulty, even from pure solutions. Thus the $\frac{1}{10000}$ grain of the former substance, when separated from 1 grain of solution, is left in the form of needles, whilst crystals can only be obtained from rather strong solutions of æsculin, and then usually appear as transparent spherical masses, with some dense tufts of short prisms.

2. *Solubility.—a. Water.* The gelsemium substance, when pure, requires 2912 parts of water for solution, even when excess of the powder is kept in contact with the liquid at a temperature ranging from 18° to 24° C. (65° to 75° F.), for twenty-four hours.

Under like conditions, Merck's æsculin dissolved in 401 parts of water. According to Trommsdorff, æsculin requires 576 parts of water for solution, but according to Minor it dissolves in 300 parts (Gmelin's 'Hand-Book,' xvi., 22).

b. Ether. One part of the gelsemium principle was readily taken up by 330 parts of *ether* of specific gravity ·728, whereas *æsculin* required at least 36,000 parts of the same fluid for solution.

So also, the former principle is rather freely soluble in *chloroform*, whilst the latter is nearly or wholly insoluble in this liquid.

3. *Sulphuric acid* dissolves the gelsemium substance to a more or less yellowish solution, which when warmed in a water oven (if the substance is pure) undergoes little or no change. Æsculin readily dissolves in the acid, but on warming the solution it quickly acquires a brownish or chocolate colour and becomes charred.

If a drop of aqueous ammonia be allowed to flow into a drop of the sulphuric acid solution of the gelsemium compound, a dirty white deposit or cloud of very minute crystalline needles separates at the margin of contact of the liquids.

If only a minute drop of the acid be employed and excess of ammonia be avoided, even the $\frac{1}{10000}$ grain of the substance will in this manner yield a very satisfactory deposit of needles. If the drop of liquid be allowed to evaporate, these crystals may be re-examined, even several times, by moistening the residue with a minute drop of water, which will quickly dissolve the ammonium salt, whilst the needles will remain, they being apparently insoluble under these conditions.

This reaction is highly characteristic of the gelsemium principle.

A sulphuric acid solution of *æsculin* under like conditions fails to yield any crystals, unless a comparatively large quantity is present and the mixture be evaporated to about dryness, when transparent nodular masses with some groups of prisms may appear.

4. *Hydrochloric acid* fails to dissolve or act upon the gelsemium compound, even under the heat of a water-bath. Æsculin is readily soluble in this acid.

In the following liquid reactions the results refer to the behaviour of a few drops of $\frac{1}{100}$ solutions of both principles.

5. *Nitrate of silver* produces in a solution of the gelsemium principles a copious brownish-yellow precipitate, which soon darkens in colour, and finally the mixture becomes deep blue-black, due to the reduction of the silver salt. This reaction will manifest itself, after a time, even in a $\frac{1}{50000}$ solution.

Æsculin yields from a $\frac{1}{100}$ solution, a slight dirty yellow precipitate, which remains unchanged for several minutes; it then slowly darkens.

6. *Corrosive sublimate* throws down a copious yellowish precipitate, from which the organic acid quickly separates as large tufts of needles.

Æsculin fails to yield a precipitate or crystals.

7. *Bromine* in *bromohydric acid* produces a copious green deposit, which quickly acquires a bluish and finally a brownish colour.

Æsculin yields a slight yellow precipitate, which becomes yellowish-grey.

8. *Sulphate of copper* causes in a solution of the acid a dirty brown precipitate, which soon assumes a dull red colour, and crystalline needles separate.

Æsculin yields a bluish-white deposit, which undergoes little or no change.

9. *Acetate of lead* (neutral) produces a copious yellow precipitate, which after a time is partly changed into very minute star-like groups of crystals. These are insoluble in ammonia, but readily soluble in acetic acid, being quickly replaced by slender needles of the free acid.

Æsculin yields a somewhat similar precipitate, but no crystals were obtained.

10. *Physiological action.—a.* 0·010 gram (about $\frac{1}{6}$ grain) of the gelsemium principle was administered hypodermically to a frog. After a few minutes the eyes were fluorescent, and the animal seemed sluggish; after half an hour it was somewhat excited and apparently weak. No other marked symptoms were noticed during the several hours the animal was observed

A similar quantity of *æsculin* produced fluorescence of the eyes, but no other apparent effect.

b. 0·033 gram ($\frac{1}{2}$ grain) of the gelsemium substance, prepared by precipitation with hydrochloric acid, being injected into the peritoneum of a frog, was quickly followed by violent agitation; the animal became rigid, and reflex action was markedly diminished. In *five minutes* the animal was apparently lifeless; there was rigidity of the abdominal muscles, which slowly relaxed. After forty minutes, the heart had ceased to beat, was relaxed and not irritable.

c. A similar quantity, injected into the posterior lymph sack, was quickly followed by great agitation and general

prostration. In fifteen minutes active voluntary movements appeared, and there was marked fluorescence of the entire eye-ball. After forty minutes the heart was found still beating, but ceased fifteen minutes later.

In another experiment, a like quantity caused a complete cataleptic condition and death within ten minutes.

d. 0·033 gram of *æsculin* injected into the peritoneum of a similar frog produced *no apparent effect*, other than a marked fluorescence of the eyes, which continued some fifteen hours.

For these physiological experiments, I am much indebted to Dr. Edward T. Reichert. These results, in regard to the gelsemium principle, confirm in a measure those previously obtained by Dr. Isaac Ott (*American Practitioner*, 1877).

Conclusions.—It is needless to add that the only conclusion from the foregoing comparative results is that the principles examined *are very different substances.* Hence the name *gelsemic acid* will be retained provisionally for the gelsemium principle.

Gelsemine.—As supplementary to our former paper on the subject, some of the more important properties and reactions of gelsemine may be mentioned.

In its pure state gelsemine is a colourless, odourless solid, having a persistent bitter taste. It has not yet been obtained in the crystalline state. At something below 100° C. it fuses to a colourless liquid. Gelsemine completely neutralizes acids, forming salts, most of which are freely soluble in water and alcohol.

The pure alkaloid is soluble, under ordinary conditions, in 644 parts of water. It is freely soluble in ether and in chloroform.

The most characteristic reactions of the solid alkaloid are the following:

1. *Sulphuric acid* dissolves gelsemine with a reddish or brownish colour to a solution which after a time assumes a pinkish hue. If the solution be warmed on a water-bath, it acquires a more or less purple or chocolate colour.

If a small crystal of *potassium bichromate* be slowly stirred in the sulphuric acid solution, reddish-purple streaks are produced along the path of the crystal. If the potassium salt be used in the form of *powder*, or, as advised by Sonnenschein and Robbins, be replaced by *ceric oxide* (CeO_2 formerly Ce_3O_4), the purplish or reddish-purple coloration manifests itself more promptly and strongly, and may be obtained from even the one ten-thousandth grain or less of the pure alkaloid. For the detection of these minute quantities, however, it is essential that only very minute quantities of the acid and powder be employed.

This reaction of gelsemine—as remarked by Sonnenschein and Robbins, who first observed it with the cerium compound—resembles somewhat that of strychnine; but these alkaloids could not thus be confounded.

2. *Nitric acid* causes gelsemine to assume a brownish-green, quickly changing to a deep *green* colour, which slowly diffuses itself through the liquid. Almost the least visible quantity of the alkaloid, if touched with only a very minute drop of the acid, will yield this green coloration in a marked degree.

This reaction readily distinguishes gelsemine from strychnine and the other alkaloids.

Solutions of the *salts* of gelsemine are colourless, and have the strongly bitter taste of the alkaloid. These solutions yield precipitates with a number of different liquid reagents, even in some instances when highly dilute; but in no instance is the reaction peculiar to this alkaloid.

Physiological action.—0·008 gram ($\frac{1}{8}$ grain) of gelsemine, administered hypodermically to a cat, caused very marked symptoms in fifteen minutes, and death in one hour and a half.

0·010 gram, given to a frog, produced, after half an hour, great prostration, followed by tetanic convulsions and death in about four hours.

0·033 gram of the alkaloid, in the form of chloride, was injected into the peritoneum of a frog. The animal soon opened its mouth convulsively, the jaws fell at intervals, and there was quickly great muscular prostration. In twenty minutes the body was completely relaxed; the muscles not irritable under pricking; reflex action was greatly dimished, and life seemed to be extinct. On opening the thoracic cavity it was found that the heart had been arrested in diastole and was not irritable.

Gelsemium Poisoning.—The cases of gelsemium poisoning thus far reported have been, with two or three exceptions, the result of accident or ignorance. The preparation of the drug most frequently employed is the *fluid extract*, each fluid ounce of which represents 480 grains of the dried root. This preparation, as found in the shops, as we have heretofore shown (*Am. Journ. Pharm.*, 1877, 151), usually contains ·2 per cent. of gelsemine and ·4 per cent. of gelsemic acid.

Of *twenty-five* cases of gelsemium poisoning that we have collected (some private), *thirteen* proved fatal. The *fatal period* varied from *one hour* to about *eight* hours. Very small quantities of the drug may cause death. A case is reported in which a quantity of a tincture equivalent to about 12 *minims* of the fluid extract proved fatal to a child aged three years. In another instance, four doses of 15 *minims* each of the fluid extract, repeated at short intervals, caused the death of a healthy man in less than four hours after the last dose was taken. So, also, a teaspoonful of the same preparation proved fatal to a woman.

There is no chemical *antidote* known for this kind of poisoning. The application of *electricity* has in several instances proved very beneficial. In others, the use of *morphine* hypodermically has been attended with good results.

Chemical analysis.—In gelsemium poisoning the gelsemic acid and the alkaloid are both absorbed, and enter the blood apparently in the proportion in which they are found in the plant. Hence, in poisoning by the drug, it becomes necessary to direct the examination for the absorbed poison to the recovery of both these principles. This is the more important, since the acid is apparently not much less poisonous than the alkaloid, and so readily reveals its presence by its fluorescent properties.

The general method for the recovery of strychnine and like substances from the blood and tissues is about equally applicable for the recovery of the gelsemium principles. As these substances are readily soluble both in ether and chloroform, either of these liquids may be employed for the extraction. The gelsemic acid would, of course, be found in the ether extract from the prepared solution, while it still had an acid reaction; whilst the alkaloid would be extracted from the solution after it had been rendered alkaline.

In applying the tests for gelsemic acid to the ether residue from the acid solution it should be remembered that although the reaction of the nitric acid and ammonia test is common to gelsemic acid and æsculin, yet when obtained from an *ether* extract, it is characteristic of the former substance, since æsculin is not extracted by ether.

The blood and liver of a cat which had been killed, after several hours, by the drug, were examined, in the main, after this general method. The first ether extract, in both instances, was distinctly fluorescent, and on evaporation left the gelsemic acid, in part at least, in its crystalline state. The true nature of these crystals was readily established by the appropriate tests. So, also, about equally satisfactory evidence of the presence of gelsemine was obtained from the ether residues from the alkaline solutions.

As a conclusion from these and other similar results, it would appear that in gelsemium poisoning evidence of the presence of the poison in the blood may be more readily and fully obtained than in the case of any of the other vegetable poisons.

MANUFACTURE OF LACTIC ACID.*

BY CHARLES E. AVERY.

When milk turns sour spontaneously, the sugar of milk which it contains is converted into lactic acid, and Scheele, in 1780, first extracted lactic acid from sour milk.

Braconnet found the same acid in rice left under water to ferment, also in the juice of beet-root, which, after having undergone viscous fermentation, became sour and yielded lactic acid. He also found the acid in products of fermentation of many other vegetable infusions.

The same acid has been found in the sour water of starch factories, and in the well-known fermented cabbage of sauerkraut.

By lactic fermentation is understood the transformation of certain sugars, such as sugar of milk and glucose, into a syrupy acid, soluble in water, under the influence of a living being classed by the eminent French chemist and microscopist, Pasteur, among the bacteria.

Messrs Frémy and Boutron, Pelouze and Gelis, ascertained the best conditions for the production of lactic acid, and found it, they say, to require the aid of nitrogenous albuminoid matter in a state of decomposition, and for its continuance that the acidity should be kept down by neutralization. For this purpose they used oxide of zinc, carbonate of soda, or, as I prefer, the carbonate of lime, that is to say, whitening or marble dust.

Pasteur brought out the idea that the albuminoid matter was non-essential, that it could be substituted by inorganic salts, and that the real cause of the change was not decomposing albuminoids but a living ferment—establishing this latter fact, which before was a conjecture.

It is substantially here that I depart from the beaten track. I find albuminoid matter, though not, scientifically speaking, essential, is essential in a technical point of view. Moreover, it is not essential nor desirable that they should be decomposing albuminoids. I prefer them as fresh and free from putrefaction as possible. As I have no putrefaction in my solutions, the manufacture is no longer a nuisance; the odour with a pure ferment is even fragrant.

To obtain this fresh albuminoid matter at no further expense, and in large quantity, I leave in the glucose solution made from the corn meal the albuminoid residue. And from this substitution I obtain the advantage of cheapness, the advantage of healthfulness, a crude product free from the products of putrefaction, and hence more easily purified; and, lastly, the fermentation takes place in three or four days, instead of requiring ten days to a month, as by other processes.

Bensch purifies his lactate of lime by extraction with water, filtration, and recrystallization, the details at present being non-essential. The only thing worth mention is that he was able to purify his crude material. It will be seen that cane sugar is the source of his lactic acid, costing to start with eight to ten cents per pound, for any article not too dark and impure. To this sour milk and cheese are added, further increasing the expense, and the time required is a fortnight.

Considering the variability of the process, its unsavory nature and products, and the expense, it is not surprising lactic acid and the lactates have received little attention.

I find it is still a common impression among chemists that in the change of starch into glucose by the acid treatment, the transformation is very incomplete; that much of the starch remains as dextrine. This is not the case. By suitable precautions nearly all the starch should turn to glucose, and that this can be accomplished is shown by testing the solutions and residues with odine. Neither starch nor soluble starch is shown. Then by testing the solutions with six times their volume of alcohol, the substantial absence of dextrine may be shown.

Since we have some 70 per cent. of starch sugar in corn, and this converted into glucose will, by assimilation of water, increase in weight some ten per cent., we have as the theoretical yield of acid 77 per cent. Now, Bensch found 9 kilos of cane sugar to yield $10\frac{3}{4}$ kilos of neutral lactate of lime, and it is not surprising that a yield of 82 to 85 per cent. of neutral lactate has been found from 70 per cent. of starch, working by my process.

The process I adopt resolves itself into three portions: 1st, manufacture of solution for fermentation; 2nd, the fermentation; 3rd, the purification; and, lastly, there is the use of the product itself as a separate consideration.

I mix 80 to 160 pounds of oil of vitriol with 2000 pounds cold water, and stir in 2000 pounds ground maize; this corn meal may be from inferior corn, from corn more or less heated, soured, or otherwise changed. The average price of corn of good quality here is about one cent per pound, and much less in the West. Inferior qualities are of less cost. The vitriol can be bought at $1\frac{3}{4}$ cent per pound by single carboy, and would cost much less if chamber acid were used and made on the spot.

I let the meal mixture stand over night, and next morning add in portions 2000 pounds of boiling water. After boiling until the tests are satisfactory, I run the hot mixture into the fermentation tank, and neutralize with 1000 pounds carbonate of lime, stirring well. The carbonate of lime is of course in large excess. I then add 4000 pounds cold water, and a variable amount of lactic ferment; 1 or 2 per cent. seems to answer well, although a larger quantity induces fermentation more speedily, saving perhaps half a day, but less will suffice.

In a day's time the most vigorous action ensues, the carbonic acid released from the carbonate of lime escaping in large bubbles, giving the impression that the liquor is boiling. In three or four days' time, with good lactic yeast, the mass sets into crystals of lactate of lime, resembling thick mortar. I then dissolve the lactate in hot water, filter it, crystallize, press, and purify, much as in other processes, with two alterations, however. I use animal charcoal to remove odour and colour, and after acidulation, distil off the butyric acid that has been formed. By more vigorous precautions in the fermentation, I expect soon to be rid altogether of the butyric ferment, and had, indeed, already greatly reduced it, when a series of mishaps stopped for a time further progress.

From experimental results already obtained on the small scale, I have reason to believe that I can reduce the waste and cost of purification, especially in the direction of animal charcoal, and experiments will speedily be resumed in this direction. I am much assisted in this search by the comparatively clean, pure, crude material with which I start, unlike the foul mass obtained by other processes of practical value. As regards the healthfulness of lactic acid there can be no doubt. Articles containing it have been sought out as food by the human race all over the world. Sour milk, butter milk, and sauerkraut are well known to be wholesome. Their reputation the world over is good, and they are used by labourers and peasantry as regular articles of diet. If there were any doubts, these would be dispelled when I state that lactic acid is present in the flesh itself, and in the mother's milk; that lactic acid is an active agent in the digestion of food in the stomach, and a constituent of the gastric juice. For this reason it is given medicinally for the cure of dyspepsia, as in the well-known preparation of lactopepsine.

As to the value of lactic acid and acid lactates in raising bread, as substitutes for cream of tartar, there can be no question, for sour milk always has raised bread, and made good bread, and cream of tartar is a

* From the *Proc. Soc. Arts*, Boston. Reprinted from the *Weekly Drug News*, July 21, 1882.

substitute for lactic acid rather than lactic acid a substitute for it. At present prices of milk the cost is greatly reduced. The corn is not fed to the cow partly to be wasted in maintaining heat and life, and partly to be returned as fat and decomposed sugar; but by a simple change turns almost completely to lactic acid. In one respect, however, I think an advantage may be fairly claimed for the acid lactate of lime over cream of tartar, namely, it will be hard for any cook, no matter how careless, to make either sour bread or alkaline bread, and every cook has such failures with cream of tartar. In cream of tartar, or acid tartrate of potash, the acid molecule reacts on the saleratus to free the gas; unless the exact proportions be hit and the mixture be complete, the bread is alkaline wholly or in spots if the saleratus be in excess, and sour if the acid tartrate be in excess.

The acid lactate is a permanent salt, not readily changed to butyrate; not diliquescent; not too gum-like to resist powdering.

In Miller and other works of good standing it is stated the raw corn meal under like conditions had but partly changed to lactic acid in forty days. Technically speaking, corn meal cannot furnish lactic acid unless the starch be first transformed. Nor will it then give lactic acid in quantity unless the albuminoid matter be either added or left in the presence of the nitrogenous phosphatic salts, if the neutralizer of the ferment is not a fulfilment of all the conditions for large and varied yield; we must at present have albuminoid matter present. It has been fully shown that it is not essential that this albuminoid should be rank or putrid, but that better and quicker results were obtained with fresh vegetable albuminoids than with stale animal albuminoids. I have improved the purification by introduction of animal charcoal and distillation, and have made the operations inoffensive. With regard to cheapness, little needs to be said. With a yield of lactic acid equalling 50 per cent. of the weight of corn employed, with meal at 1 cent per pound, chalk or whiting at $\frac{7}{8}$ of a cent, and sulphuric acid at $1\frac{3}{4}$ cent, coal being assumed at 6 dollars per ton, the cost of materials for 1 pound of lactic acid is about $4\frac{1}{4}$ cents.

By shrewd location of the factory, and good buying in large quantities, these expenses may be largely reduced.

The operations of manufacture are not unlike those of the sugar refinery, and those are known not to be excessive.

CHINESE RHUBARB.*

Curiously enough the Chinese attach but small importance to that most valuable of roots, rhubarb. In so far as they themselves are concerned, other drugs take its place, although it seems beyond dispute that at one time they were of opinion that if supplies were cut off the detested foreigners of the north would all die of constipation. This anecdote is well vouched for; indeed, prior to the outbreak of war in 1839–40, the *terrible* threat was actually held out, Lin, or Keshan (the same Ki-chan subsequently met with by the Abbé Huc at Lla-Ssa, Thibet. This statesman was not executed as commonly supposed, for ceding Hong Kong), we forget which, was so firmly persuaded of the fact as to memorialize the Emperor regarding the advisibility of forbidding the export of rhubarb, and thus starve the foreigners into submission. But dropping anecdote, rhubarb grows wild in all the northern and western provinces, yet nowhere does it seem to be brought under cultivation, invariably being found in a wild state. Several varieties of rheum plant are indigenous to China, some being inestimably valuable, and others almost worthless. Shênsi roots are by far the most esteemed—those coming from the Kanchow district being perhaps the more prized of all. This rhubarb, the best in the market, can be readily distinguished from other kinds. The roots are large, smooth, and extremely fragrant; whereas those obtained in the province of Szechwan are smaller, rough on the exterior, deficient in flavour, and when cut give out little scent. Best Szechwan rhubarb commands only about one half the price asked for Shênsi rhubarb, while inferior qualities fetch from one-tenth upwards. In this connection it is interesting to note how strongly many Chinese hold by the belief in the utter inefficacy of roots grown in the southern provinces, which, according to their theory, are only good to sell to the English barbarians. As a fact, Russian merchants look at no rhubarb that does not bear on its face evidence of a northern derivation. In this, unfortunately, they are not imitated by their English rivals, who buy anything that is offered so long as the price is sufficiently tempting or holds out a prospect of additional profit. This points to the necessity of medical men and retail druggists exercising extreme care in the selection of their rhubarb, and perhaps, more important still, to buy only of persons in whose judgment and honesty they can place entire dependence.

Another good sample arrives at Tientsin from Hsining in Kansuh, after which town it takes its name. Chungch'i rhubarb is also greatly prized, while Chihuang, Taihuang, and Shanhuang, are about as worthless as well can be. Doubtless, however, as Mr. Detring remarks, a considerable percentage of inferior rhubarb is nothing more than dock plant root, sold under the fashionable name. Upon the properties of this sham we cannot speak authoritatively, but quite likely it possesses properties similar to those of the yellow dock and other European species of this order. It is not exactly pleasant to contemplate that the greater part of this rubbish is bought for the English market, but such nevertheless appears to be the case. The other producing districts besides those mentioned above are Chihli, Honan, and different parts of Thibet, from whence several very fine varieties, formerly sent overland, *viâ* Kiakhta through Russia, are obtained.

* From a paper on the Chinese Materia Medica, by F. Newcome, in the *Medical Press and Circular*, August 2.

AMERICAN MUSK.*

BY R. S. CHRISTIANI.

One of the most important substances for the perfuming of toilet soaps is musk; it is also the most expensive, and owing to the large amount of adulteration it is the most unsatisfactory article the manufacturer has to use.

Much of this trouble and expense can be avoided by the use of what I term "American musk," obtained from the musk rat (*Fiber zebithicus*), the well-known rodent, native of the United States and found in nearly all parts of it, frequenting the streams and marshes, and having habits similar to the beaver.

The musky secretion is found in two sacks, situated between the anus and the genital organs, and is emitted by the animal when excited. These animals are easily trapped and killed for their skins, which are shipped in large quantities to Europe at this season of the year. The fur though looking coarse, from the longer hairs, is very soft and fine beneath, and is dressed and coloured and largely used for the cheaper furs.

To the manufacturer of toilet soaps the American musk is almost invaluable, being nearly as good and as strong as the real. The reaction of the alkali, necessary to all soap, having a softening and modifying property upon the strong odour, which is also improved by the addition of the spice oils and other perfuming substances.

I have for many years used this substance in soaps, sachet powders, etc., but do not recommend it for essences, though much is used in the cheaper kinds. In using it in soaps I have found that time is required to improve the odour, and when a cake of soap so perfumed has been kept for a few months, it would require a very skilful perfumer indeed to distinguish the odour from that of the best tonquin musk.

* From the *Oil, Paint and Drug Reporter*, April 12, 1882.

The Pharmaceutical Journal.

SATURDAY, AUGUST 5, 1882.

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

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DECISION OF THE PRIVY COUNCIL AS TO THE PROPOSED ADDITIONS TO THE POISON SCHEDULE.

THE decision at which the Privy Council has arrived after consideration of the resolution submitted to it by the Council of the Pharmaceutical Society will doubtless be disappointing to those who were mainly instrumental in bringing about the action of the Society's Council. Of course it was not unknown that one of the chief reasons for recommending that spirits of salts, oil of vitriol, hellebore, etc., should be made poisons within the meaning of the Act was the systematic misuse of these materials by waggoners and other persons entrusted with the care of farmers' horses. The evil is no imaginary one; but if we may judge from the decision of the Privy Council, it is one that farmers and owners of horses will have to find some other remedy for besides the restriction of trade which was recommended to be enforced under the provisions of the Pharmacy Act.

From the pharmacist's point of view also a lesson may be learnt from the refusal of the Privy Council to give effect to the recommendation of the Council. It shows how little reason there is to hope for any protection of pharmaceutical interests by legislative enactments and how much more necessary it is that any such protection as those interests require should be provided by the united voluntary action of those most concerned. That the sellers of drugs should have a technical acquaintance with the articles they deal in is a proposition that will be readily assented to from the point of view of public interest alone, and from similar considerations it will be even more readily admitted that those entitled to prepare medicines for use by the sick should have a special qualification; but beyond this point it does not appear to be in harmony with the spirit of the age to push the demands for class protection. The recognition of the need for qualification being, therefore, all that seems to be obtainable from the legislature on the ground of regard of the public interest, it does not require much acumen to perceive that, if pharmaceutical interests require protection, the means of providing it is in the hands of those whose business it is to regulate and supervise the grant of that qualification. It is by such a mode of procedure as Mr. SCHACHT has devised in regard to educational training and the conditions under which examinations are conducted with a view to registration, that the protection of pharmaceutical interests is to be most thoroughly secured. That is a means which is already within the power of the Council and it is one which the Council should be supported in the application of to the very utmost. In this free trade age, when popular opinion, blinded by the glare of co-operative fallacies, has lost the faculty of judgment as to sound views of political economy, it seems almost hopeless to seek for a rational recognition of the value of pharmaceutical services on the basis of abstract principles, and nothing remains, meanwhile, but to make the best use we can of such powers as we have command of.

It is, in short, by enforcing to the utmost possible degree the stringency of the test by which qualification to carry on the business of the pharmacist is obtained that we may best hope to effect an improvement of the condition and status of those engaged in that business. It is highly improbable that we shall ever go back to the conditions of restriction which are still in force in some other countries. These conditions belong to a past epoch of society, and though they may for a while remain in countries where they have long been in existence, there is little prospect of their introduction in other countries where they have not before been operative. Even in Germany, where the restrictive system of regulation is most in force as regards pharmaceutical affairs, we have abundant evidence that it is maintained only by great effort, and that the growth of antagonistic influences is so rapid as to portend its overthrow at no very distant period. With such a tendency everywhere evident, what have pharmaceutical interests to look to for protection but the maintenance of individual qualification, and the joint efforts of all belonging to the business to secure that condition in the highest degree?

THE REGULATION OF PHARMACY IN WISCONSIN.

THE Wisconsin Pharmacy Act, which has furnished the opportunity for a pleasant courtesy, referred to at the meeting of the Council on Wednesday, is a very recent addition to the pharmaceutical legislation of the United States, having been passed in March last. In form it very closely resembles the Illinois Act of last year, and as it fairly represents one phase of American opinion as to the best way of regulating the supply of medicines and poisons, some space may be devoted to an analysis of it.

The Act commences by making it unlawful for any other person than a registered pharmacist to "retail, compound, or dispense drugs, medicines or "poisons, or to institute or conduct any pharmacy, "store or shop for retailing, compounding or dis-"pensing drugs, medicines or poisons," but it permits any unregistered person to own a business if

he places the store or shop in charge of a registered pharmacist. The wide scope of the original prohibition is further modified by a later section, which exempts from its operation the supply by a physician to his patient of "such articles as may seem to him proper," the vending of patent or proprietary medicines, or of medicines in sealed packages, labelled with the name of the particular article and of the pharmacist or physician preparing it, as well as the sale of the "usual domestic remedies" by dealers.

The persons entitled to registration under the Act are such as were engaged in the business of dispensing pharmacists on their own account at the time of the passing of the Act, "Graduates in Pharmacy" and "Licentiates in Pharmacy." A "Graduate" is defined as a person who has had four years' practical experience in drug stores where the prescriptions of medical practitioners are made up and holds a satisfactory diploma or other credential from a regularly incorporated college or school of pharmacy. A "Licentiate" is a person who after two years' similar practical experience passes a satisfactory examination before the board constituted under the Act. Every assistant who has had two years' practical experience at the time of the passing of the Act, but does not possess a qualification for registration as a "registered pharmacist," if not less than eighteen years of age, is entitled to a certificate of registration as a "registered assistant," which certificate gives him the right to continue in his duties as clerk or assistant, but not to carry on business on his own account before he has had five years' experience.

The Board of Pharmacy consists of five examiners, chosen by the Governor of the State from "ten competent pharmacists," whose names are to be submitted for the purpose by the Wisconsin Pharmaceutical Society. Each successive year one member of the Board is to vacate his seat, by rotation after the first five years, and the vacancy is to be filled by the Governor nominating one of three persons selected by the Society; eventually, therefore, the appointments will be for five years. The Board is to meet at least once in three months and its business is to examine candidates, grant certificates of registration, cause the prosecution of persons violating the provisions of the Act, and to report annually to the Governor and the Pharmaceutical Association on the condition of pharmacy in the State.

The fees for registration are fixed very low, that for registration by examination being only five dollars, with the proviso that if the candidate fails the whole fee shall be returned to him. If the proportion of unsuccessful candidates be nearly as large as obtains sometimes in the examinations in Great Britain, this shifting of the penalty of failure might prove a Nemesis to too exacting examiners, since the payment of these functionaries is to come out of the proceeds of their operations, and it is expressly stipulated that none of the expenses shall come out of the coffers of the State. On the other hand, every registered person desiring to retain his position will have to transmit annually to the Board an intimation to that effect, together with a fee not exceeding two dollars.

Any person not being himself a registered pharmacist, nor employing one, who carries on business in contravention of the Act, will be liable to a penalty of fifty dollars; and any registered pharmacist who permits the dispensing of prescriptions, or the vending of drugs, medicines or poisons in his place of business, except under the supervision of a registered pharmacist or by a registered assistant, will be liable to a similar penalty. All suits for the recovery of penalties are to be prosecuted in the name of "the people of the State of Wisconsin" by the county attorney, and the penalties are to go one-half to the Board and the remainder to the school fund of the county in which the suit is prosecuted and judgment obtained.

The section of the Act relating to poisons provides that no person shall sell by retail "any poisons commonly recognized as such,"—and especially some that are mentioned by name,—without affixing a label bearing the name of the article, the word "poison," and the name and address of the seller. It is also made illegal to sell such poisons to a person under fifteen years of age, or to any one without first ascertaining that the poison is to be used for a legitimate purpose. The penalty for each offence under this section is five dollars.

Lastly, there is an adulteration clause with a penalty of not less than fifty or more than a hundred dollars for a first offence, and for each subsequent offence a penalty of not less than seventy-five or more than one hundred and fifty dollars, the offender paying the costs in all cases. Not only does the actual sophisticator come under this penalty, but every proprietor or conductor of a drug store is to be held responsible for the quality of the articles sold by him, except when they are sold in original packages, or consist of patent or proprietary preparations. An offender under this action is also liable to have his name struck off from the Register.

THE MANCHESTER PRICE LIST.

Although the most sanguine can hardly expect to see the time when the charges for dispensing and drugs shall become uniform, even amongst chemists living in the same towns or districts, there is much room for improvement in this respect. We are therefore pleased to notice the issue of a fourth edition of the List of Retail Prices recommended by the Council of the Manchester Chemists and Druggists' Association. Only two years have elapsed since the third edition was published, during a part of which interval it has been out of print, and in the appreciation of their work thus evidenced the Council of the Manchester Association will doubtless find a sufficient reward. The book bears the imprint of Mr. Silverlock, and we presume it could also be obtained from the Secretary to the Association.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 2, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Savage, Schacht, Squire, Symes, Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he had received a letter from Mr. Hampson signifying his desire to withdraw from the Education Committee.

DIPLOMAS.

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

Bain, John.
Caldecott, Clement Guest.
Dowdeswell, Jonathan.
Drew, Walter Clark.
Holmes, Francis.
Kinross, William Malloch.
Murray, George.
Wheatley, Joseph.
Yeatman, Frederick James.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bain, John.....Bridge of Allan.
Dowdeswell, Jonathan.....Beaminster.
Kinross, William Malloch .....Newcastle-on-Tyne.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Ellard, James .....London.
Emmerson, George John.....Leyton.
Stephens, Jonathan .....Devonport.
Surfleet, Walter .....London.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Allen, Samuel .....Worcester.
Arthur, Charles.....Edinburgh.
Bowering, John .....Taunton.
Comer, Ernest Edward .....East Dereham.
Cullwick, Herbert Ernest .....Knighton.
Deeks, William Thomas .....Shanklin.
Dillon, Charles Linder.....Hereford.
Evans, William.....Cardigan.
Fentiman, Charles Henry .....London.
Field, Henry.....Yeovil.
Foggitt, John Blackett .....Thirsk.
Frost, John Henry .....London.
Greenall, Thomas Holdsworth...Ashton.
Hall, Amos .....Stafford.
Hankinson, George Robert.....Grange-over-Sands.
Hanson, Christopher .....Buckhurst Hill.
Innes, David.....Stalybridge.
Loam, James Gilbert .....Liverpool.
Mann, Joseph .....Peterborough.
Meadows, John Martin .....Swindon.
Nichol, Anthony .....Carlisle.
Noble, Henry Edward.....Peterborough.
Norburn, Albert Edward .....London.
Northen, Charles .....Thorpe-by-Water.
Parker, Thomas Herbert .....Bedford.
Pearson, William.....Sinderland Green
Pickering, Wade .....Crowle.
Rodmell, John Gale.....Rochester.
Rowland, Thomas William.....Epping.
Sergent, William Thomas .....Croydon.
Shapcott, William Henry Pyne..London.
Thomas, John Henry .....Chester.
Thomas, Joseph Arden .....Cambridge.
Thomas, William Hendy .....Penryn.
Townsend, Henry Holden .....London.
Tyson, Thomas Balmforth .....London.
Warburton, Edward .....Farnworth.
Waymouth, Thomas Staddon...Exeter.
Wells, William George .....Maidstone.
Williams, William Jesse .....Crickhowell.
Wood, John Ridal .....Rotherham.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students of the Society":—

Beanland, John Milner .....Keighley.
Bennett, Albert .....Leeds.
Bolton, Richard Lee .....Leith.
Brown, Joseph .....Walker-on-Tyne.
Cain, James Harold.....Douglas.
Clark, George Alexander .....Portsoy.
Clarkson, Joseph .....Skipton-in-Craven.
Cooper, Albert .....Huntingdon.
Cope, William James .....Longton.
Coutts, William Alexander.....Pathhead.
Cumming, John .....Portsoy.
Dowswell, Charles Wesley .....Tewkesbury.
Evans, Daniel Ashton .....Llanbrynmair.
Fox, Albert .....Atherstone.
Fox, William Arthur .....Cleckheaton.
Franklin, Alfred James .....Brighton.
Grant, Alexander.....Blairgowrie.
Grant, Arthur Thomas, jun., ...Helston.
Hampson, William .....Leigh.
Hawkins, Lewis Walter .....London.
Head, George .....Bridgnorth.
Honiatt, Albert Thomas .....Hereford.
Johnson, Henry .....London.
Kemplay, Arthur .....Leeds.
King, Frederick Herbert.....Market Drayton.
Lowe, Osmond Henry .....Maidenhead.
Naylor, James Louis .....Brownedge.
Pelham, Sydney .....Basingstoke.
Pettigrew, James.....Glasgow.
Rees, Colin Atkins .....Dartmouth.
Shepard, William.....Newport (I. of W.).
Smith, Charles B.....Potton.
Theckston, James.....Ulverston.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The name of the following person who had made the required declaration and paid a fine of one guinea was restored to the Register of Chemists and Druggists:—

Henry Ballinger Ryley, 38, Skinnergate, Darlington.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a life member; applicant has received four previous grants.

£10 to a pharmaceutical chemist, member from 1853 to 1877, who has had two previous grants.

£5 to the widow of a former annuitant.

£10 to the widow of an associate, who has had four previous grants.

Other cases had been before the Committee, concerning which no recommendations were made.

The Secretary had reported the receipt of a letter from the Local Secretary at Worcester, stating that in company with another member he had made a canvass of the chemists in that city and obtained subscriptions to the amount of £6 15*s.* 6*d.*

The Council went into committee whilst the President explained the circumstances of one of the applicants for relief. On resuming, the report and recommendations of the Committee were received and adopted, the President drawing special attention to what had been done at Worcester.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Librarian's Report.

The report of the Librarian had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June	Day	422	27	5	16
	Evening	131	11	3	6

Circulation of books.	No. of Entries. Town.	Country.	Total.
June	178	115	293

Carriage paid, £2 11*s.* 2½*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Chemical Society of London, Journal. Sundry vols.
Royal Society of London, Proceedings. Sundry vols.
Deutsche Chemische Gesellschaft, Berichte. Sundry vols. From Mr. Walter Hills.
Gräbner (F.), Beiträge zur Kenntniss der Ptomaïne in gerichtlich-chemischer Beziehung, 1882.
Schwarz (E.), Der forensisch-chemische Nachweis des Gelsemins in thierischen Flüssigkeiten und Geweben mit Berücksichtigung seiner Unterscheidung von Strychnin und diesem verwandten Alkaloiden, 1882. From Professor Dragendorff.
Hellin-Criquelion (C.), L'exercice de la pharmacie au point de vue constitutionnel et légal, 1882. From the Author.
Massachusetts College of Pharmacy, [Sixteenth annual] Catalogue, 1882–3. From Dr. B. F. Davenport.

The Committee recommended the purchase of the undermentioned works:—

Brodie (Sir B.), Ideal Chemistry.
Napheys (G. H.), Modern Medical Therapeutics, 7th edition.
Neale (R.), Medical Digest, 2nd ed., 1882.

The Librarian had reported the need of better ventilation in the Library. The Committee had agreed that the matter should be left in the hands of the President, and that he should report and recommend to the Council.

The Librarian had informed the Committee that the annual meeting of the Library Association would be held at Cambridge on September 5, 6, 7 and 8. The Committee recommended that the Librarian should attend the meeting.

Curator's Report.

The Curator had reported the average attendance in the Museum to have been—

		Total.	Highest.	Lowest.	Average.
June	Morning	333	21	4	13
	Evening	120	11	0	4

The Curator had also reported that he had received an application from M. Eugène Collin, of Verdun, France, for the loan of a specimen of Canton stick rhubarb from the Pereira collection of Materia Medica. The request had been acceded to.

The Professors had attended and reported satisfactorily on their respective classes; Professor Attfield had also presented a statistical report as to the Practical Chemistry class.

The various alterations in the ventilating and cleaning of the premises had been further considered.

The Council went into committee to discuss certain matters arising on the report of the Committee. On resuming, the report and recommendations were unanimously adopted.

GENERAL PURPOSES.

The report of this Committee included the reports of the Professors as to the School of Pharmacy prizes, the report of the examiners appointed to conduct the competition for the Pereira Medal, etc., and Professor Bentley's report on the Herbarium Prize. The purport of these reports was as follows:—

Chemistry and Pharmacy.

Professor Redwood reported that at the examination at the termination of the second course of five months there were only two competitors, who, although they acquitted themselves fairly well as junior students, failed to gain the required number of marks to entitle them to any award. For the sessional examination for the silver medal there were seven competitors, of whom five furnished papers of considerable merit, and were entitled to recognition.

Materia Medica and Botany.

Professor Bentley reported that at the examination at the termination of the second course of five months there was only one candidate, there being very few eligible to compete. The answers of the candidate were, however, so good that he did not hesitate to recommend that he be awarded a bronze medal.

For the sessional examination for the silver medal and certificates the number of candidates had been over the average, and the marks obtained by the majority of candidates were unusually high. Altogether the examination was the best which had taken place for some years. He also reported most satisfactorily of the good conduct, punctuality, and regularity of attendance of the students generally.

Herbarium.

For the Herbarium Prize there had been five collections submitted, the best of which contained over six hundred specimens, and was excellent in every respect. The next two were about equal in order of merit, for the one contained the greater number of specimens, whilst the other was better prepared, and the Professor recommended that a bronze medal be awarded to each. The fourth and fifth collections each deserved a certificate of merit, the latter containing over five hundred specimens, but was not so well prepared as to entitle the competitor to a higher award.

Practical Chemistry.

Professor Attfield reported that fourteen students had competed for the prizes in his class, of whom five obtained

sufficient marks to entitle them to medals or certificates. He also reported favourably of the general good conduct and diligence of the students.

Council Examination Prizes.

The examiners appointed to conduct these examinations reported that there were six competitors, five in London and one in Edinburgh. Three competitors were entitled to recognition.

The report included the usual letter from the Solicitor, stating the progress of matters which had been placed in his hands.

Several cases of alleged infringement of the Pharmacy Act had been brought before the Committee and in each case it was recommended that proceedings be taken.

This part of the report was as usual considered in committee.

On resuming, the report and recommendations of the Committee were received and adopted.

PRIZE AWARDS.

The following awards were made on the recommendation of the General Purposes Committee:—

Chemistry and Pharmacy.

[Ten months' course.]

Silver Medal ..... Frederick Wm. Short.

Certificates of Honour ..... Walter Clark Drew. Edward Marsh.

Certificates of Merit ..... Richd. Augustus Cripps. Thos. Goddard Nicholson.

Botany and Materia Medica.

[Five months' course.]

Bronze Medal ..... Henry Hamilton.

[Ten months' course.]

Silver Medal ..... Frederick Wm. Short.

Certificates of Honour ..... Equal: George F. Callaway. Thos. G. Nicholson. Walter Clark Drew. Equal: Rd. Augustus Cripps. Frdk. Jas. Yeatman.

Certificates of Merit ..... Edward Marsh. T. Staddon Waymouth. Edgar Haward.

Practical Chemistry.

Silver Medal ..... Frederick Wm. Short.

Bronze Medals ..... Frdk. James Yeatman. Richd. Augustus Cripps.

Certificates of Merit ..... Edgar Haward. Walter Clark Drew.

Herbarium Prize.

Silver Medal ..... Henry Hamilton.

Bronze Medals ..... Equal: Frdk. V. Butterfield. T. Goddard Nicholson.

Certificates of Merit ..... Henry Edward Skyrme. Edward Henry Farr.

Council Examination Prizes.

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

Frederick William Short.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

William Kirkby.

Pharmaceutical Society's Medal (bronze); and Books value £2, presented by Mr. T. H. Hills.

Frederick James Yeatman.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Committee appointed to make the award of the Jacob Bell Memorial Scholarships for the ensuing session, subject to the approval of the Council, reported that twenty candidates had presented themselves at the following centres:—Cambridge, 1; Canterbury, 2; Cardiff, 1; Carnarvon, 1; Darlington, 2; Lincoln, 2; Liverpool, 1; London, 8; Norwich, 1; York, 1. Of these, five had obtained more than the maximum number of marks requisite to entitle them to the award.

The envelopes bearing the mottoes of the successful candidates having been opened, their names were found to be

William Edward Crow
and
Edward Baily.

The report was received and adopted.

Upon the motion of the President, seconded by the Vice-President, votes of thanks were passed to Messrs. Clark and Gibson, who had examined the papers for the Council prizes, and to Messrs. Benger and Ekin, who had performed the same duties with regard to the Jacob Bell Memorial Scholarships.

A vote of thanks was also given to Professor Bentley for his report on the Herbarium competition.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The following gentlemen were appointed Superintendents and Deputy-Superintendents of written examinations for the ensuing year:—

Superintendents.

Aberdeen ..... Davidson, Charles.
Birmingham ..... Southall, William.
Brighton ..... Gwatkin, James Ross.
Bristol ..... Stroud, John.
Cambridge ..... Deck, Arthur.
Canterbury ..... Bing, Edwin.
Cardiff ..... Hollway, Albert Brown.
Carlisle ..... Thompson, Andrew.
Carmarthen ..... Davies, Richard Morgan.
Carnarvon ..... Lloyd, William.
Cheltenham ..... Smith, Nathaniel.
Darlington ..... Robinson, James.
Douglas, Isle of Man ..... Breary, William A.
Dundee ..... Hardie, James.
Edinburgh ..... Stephenson, John B.
Exeter ..... Delves, George.
Glasgow ..... Kinninmont, Alexander.
Guernsey ..... Arnold, Adolphus.
Hull ..... Bell, Charles Bains.
Inverness ..... Galloway, George Ross.
Jersey ..... Ereaut, John, jun.
Lancaster ..... Bagnall, William Henry.
Leeds ..... Reynolds, Richard.
Lincoln ..... Maltby, Joseph.
Liverpool ..... Symes, Charles.
London ..... Taylor, George Spratt.
Manchester ..... Wilkinson, William.
Newcastle-on-Tyne ..... Martin, Nicholas Henry.
Northampton ..... Bingley, John.
Norwich ..... Sutton, Francis.
Nottingham ..... FitzHugh, Richard.
Oxford ..... Prior, George Thomas.
Peterborough ..... Heanley, Marshall.
Sheffield ..... Ward, William.
Shrewsbury ..... Cross, William Gowen.
Southampton ..... Dawson, Oliver Robert.
Truro ..... Percy, Thomas Bickle.
Worcester ..... Virgo, Charles.
York ..... Davison, Ralph.

Deputy-Superintendents.

Aberdeen ..... Kay, James Petrie.
Birmingham ..... Churchill, Walter John.

Brighton	Savage, William Wallace.
Bristol	Pitman, John.
Cambridge	Hoare, William P.
Canterbury	Amos, Daniel.
Cardiff	
Carlisle	Hallaway, John.
Carmarthen	Davies, R. Morgan., jun.
Carnarvon	Francis, James.
Cheltenham	Barron, William.
Darlington	Hutchinson, Rev. E.
Douglas, Isle of Man	Brearey, Arthur W.
Dundee	Kerr, Charles.
Edinburgh	Ainslie, William.
Exeter	Lake, John Hinton.
Glasgow	Davison, Thomas.
Guernsey	Collenette, Adolphus.
Hull	Baynes, James.
Inverness	Galloway, George.
Jersey	Ereaut, John.
Lancaster	Hall, William.
Leeds	Smeeton, William.
Lincoln	Battle, John Scoley.
Liverpool	Sumner, Robert.
London	Bremridge, Richard. Holmes, Edward M. Knapman, John W.
Manchester	Wilkinson, George.
Newcastle-on-Tyne	Stuart, Charles Edward
Northampton	Mayger, William D.
Norwich	Corder, Octavius.
Nottingham	Parker, William H.
Oxford	Thurland, Thomas Henry
Peterborough	Saunders, James Edwin.
Sheffield	Maleham, Henry.
Shrewsbury	Blunt, Thomas P.
Southampton	Spearing, James.
Truro	Anstey, John U.
Worcester	Lunn, Thomas.
York	Sowray, Joseph.

Pharmacy in Wisconsin.

The President said he had recently had the pleasure of meeting in that house Mr. Dadd, President of the Wisconsin Pharmaceutical Association, and had to thank him for presenting the Society with a copy of an Act of Parliament recently passed by the State of Wisconsin, placing pharmacy on something like a proper legislative basis. Mr. Dadd had obtained a copy of the original document, officially certified by the Secretary of the State, which he had presented to the Society.

Mr. Williams asked what was the nature of the Wisconsin Act.

The President said it was a sort of compromise between liberty and restriction; the English and Americans were in favour of liberty, but the German element in Wisconsin was in favour of restriction.

The Vice-President said he was present when Mr. Dadd visited the premises to inspect the mode of examinations, and was very glad to hear him express the great pleasure he had experienced in witnessing those examinations. Mr. Dadd said that in America at present they had no pharmaceutical legislation except in the separate States; there was no Congressional action, which they desired to obtain. They had in America the same difficulties which had been experienced in England. He had been glad to hear Mr. Dadd's testimony to the high character of the Society's examinations, and he said it would be his endeavour on his return to get something of the same character established in his own State.

It was resolved that Mr. Dadd be thanked for the copy of the Act, and that a copy of the Journal and Transactions of the Society be sent regularly to the Wisconsin Pharmaceutical Association.

Pharmacy in Guernsey.

The President said it would be seen by the Journal of June 17, p. 1046, that there was now a Pharmacy Act in the Island of Guernsey, which provided that no person should, after a given date, dispense *aucune médicament*, unless he were either registered by the Pharmaceutical Society of Great Britain or by the École de Pharmacie of Paris. He was glad to inform the Council that much of the credit in connection with the obtaining of this enactment was due to Mr. Crossley, who had passed the Society's examination and was on the Register.

The Poison Schedule.

The following communication had been received from the Privy Council Office:—

"Privy Council Office,
"Whitehall, *July* 29, 1882.

"Sir,—I am directed by the Lords of the Council to transmit to you to be laid before the Pharmaceutical Society, the accompanying order of their lordships approving the resolution of that Society of the 1st February, 1882, so far as regards nux vomica, viz., 'that nux vomica and its preparations should be deemed a poison within the meaning of the Pharmacy Act, 1868, and also a poison in the second part of schedule A of that Act.'

"Their lordships after giving their careful consideration to the proposals contained in the resolution were of opinion that pending the consideration of the expediency of further legislation with reference to the sale of poisons it is not desirable to add to the restrictions on the sale of the acids and other articles referred to in the resolution.

"I am, Sir,
"Your obedient servant.
(Signed) "C. L. Peel.

"The Secretary and Registrar
"of the Pharmaceutical Society."

"At the Council Chamber, Whitehall.
"The 28th day of July, 1882.

"By a Committee of the Lords of Her Majesty's Most Honourable Privy Council.

"Present:
"Lord Privy Seal
"Lord Richard Grosvenor
"Mr. Mundella.

"Whereas by 'The Pharmacy Act, 1868, Section 2,' it is enacted that the Council of the Pharmaceutical Society of Great Britain, may from time to time, by resolution declare that any article in such resolution named ought to be deemed a poison within the meaning of that Act, and thereupon, the said Society shall submit the same for the approval of the Privy Council, and that, if such approval shall be given, then such resolution and approval shall be advertised in the *London Gazette*, and on the expiration of one month from such advertisement the article named in such resolution shall be deemed to be a poison within the meaning of that Act.

"And whereas the Council of the Pharmaceutical Society of Great Britain did, on the 1st day of February, 1882, resolve and declare, by virtue and in exercise of the powers vested in the Council of the Pharmaceutical Society of Great Britain, that, amongst other articles, 'Nux vomica and its preparations' 'ought to be deemed a poison within the meaning of the Pharmacy Act, 1868, and ought to be deemed a poison in the second part of the Schedule A of the said Pharmacy Act, 1868.'

"And whereas the said Society have submitted the said resolution for the approval of the Privy Council, and the lords of the Privy Council are of opinion that the said resolution, so far as regards nux vomica and its preparations, should be approved,

"Now, therefore, their lordships are hereby pleased to signify their approval of the said resolution, in so far as regards nux vomica and its preparations.

"C. L. Peel."

Pharmacy in Victoria.

The following letter from the Pharmacy Board of Victoria was read:—

"Pharmacy Board, Victoria,
"Melbourne, *June* 5, 1882.

"To the President and Council,
"Pharmaceutical Society,
"Bloomsbury Square, London.

"Gentlemen,—Referring to your letter of the 10th November, 1881, in reply to a communication addressed to you on the 8th July, 1881, in reference to the certificate of the Pharmacy Board of Victoria receiving some recognition by the Pharmaceutical Society of Great Britain—

"The Board are of opinion that the nature of their request has been misunderstood, and would therefore again respectfully draw the attention of the Council to the subject.

"The concessions asked for by the Board are as follows:—

"1st. That those persons only who have passed the Major examination under the Pharmacy Act of Victoria, 1876, as directed by the 18th section, may be enabled to carry on the business of a chemist and druggist in England without further examination.

"2nd. That should any candidates holding the Victorian Major Examination Certificate elect to present themselves for the examination of the Pharmaceutical Chemists of Great Britain, some privilege should be given in recognition of their Colonial studies.

"The Board would respectfully point out that the course of study required by the Victorian Pharmacy Act for the Major Certificate is nearly identical with that required at Bloomsbury Square, and in asking for some recognition for those who have passed the Major examination the Board only seek an equitable adjustment between the Victorian Certificate and that of the Pharmaceutical Society of Great Britain.

"The exemption of holders of the English Certificate was specially made by the Pharmaceutical Society of Victoria when framing the Pharmacy Act.

"It is probable that but few of the students from Victoria will avail themselves of the privilege asked for; whereas numbers of gentlemen holding the Certificate of the Pharmaceutical Society of Great Britain are constantly arriving in Victoria, who qualify on the production of their certificate, a privilege the Board are desirous should still be retained in the Victorian Pharmacy Act.

"We have the honour to be, Gentlemen,
"Your obedient servants,
"Joseph Bosisto, *President*,
"Harry Shillinglow, *Registrar*."

The President said it would be remembered that a similar communication had been received last year, and was referred to a Committee to report upon, the report being that at present the Council had no power to do what was asked. Of course it would be a question whether the Council would be disposed to ask for powers to accept the certificates of examining bodies outside of Great Britain. He believed the view of the Committee at that time was that, at all events for the present, and probably for some years to come, it was not expedient that such certificates should be received. A letter to that effect was sent last year, and this was a reply asking the Council to reconsider the subject.

Mr. Churchill remarked that these gentlemen only asked that their Major examination should be considered equivalent to the Minor in England.

The President said he understood that in Victoria there were no "chemists and druggists," but all registered men had the title of "pharmaceutical chemist." Substantially it was asking that the Victoria qualifying examination should be recognized as a qualification for practice in Great Britain. The simple answer was that the Society had no power at present to do so.

Mr. Radley thought it would be desirable to have some such arrangement, if it could be managed satisfactorily.

The President remarked that at present the British Act did not even permit the recognition of certificates from Ireland.

Mr. Williams: Nor from any body in which the examinations were not controlled by the Society.

Mr. Radley said the Council had no power at present, but he did not see why it should not obtain power if the opportunity offered.

Mr. Savage thought it desirable that as far as possible there should be reciprocity. The only thing necessary was to be sure that the examinations were of equal value.

The President said all depended on the value of the certificate. The Victoria Board had only lately been created, and though a syllabus of the examinations had been sent, the Council did not know anything about the way in which they were carried out. He had no doubt that in time it would be necessary for all English-speaking countries to have reciprocity in such matters; but the gentlemen in Victoria surely would not wish those who had a thoroughly high standard to lower it in any way. He did not say that the Victoria standard was lower, but that Board was a much younger body, and until it had gained some experience in the process of examination and education, it would probably be wise to hesitate before accepting its certificates. It was only of late years that men possessing the highest qualifications obtained on the continent had been accepted on the Medical Register of this country.

Mr. Young sympathized with the remarks of Mr. Savage, and he thought that when a young country had grown into something like prominence, and its examinations were shown to be equivalent to those in this country, it would be well to accept its certificates, provided the Council had the power to do so.

The President said a reply should be sent to much the same effect as before, stating that the Council had no power at present to accede to the request, but that when it went to Parliament for fresh powers the general policy of reciprocity might be considered.

This was unanimously agreed to.

The Vice-President said it would be a great responsibility to ascertain what was the character of the examinations in question.

Preliminary Examination.

The President said a communication had been received from the Hon. Secretaries to the Oxford and Cambridge Schools Examination Board describing the nature of the examinations which it was intended to institute in connection with schools throughout the country, and asking if certificates granted by that body would be accepted in lieu of the Preliminary examination. In the last paragraph inquiry was made if it would be considered satisfactory to allow the head master of a school in certain cases to supervise the examinations. He had gone carefully through the scheme with the Vice-President, Secretary and two members of the Board of Examiners, and they all agreed that certificates in class 1 might be accepted in lieu of the Preliminary examination, but they did not think it desirable that the head master of a school should be the sole supervisor of an examination conducted in his own school.

Mr. Williams said he could give no opinion on the scheme as a whole, but if it included all the subjects required in the Preliminary examination he did not see why the certificate should not be accepted.

The President said this appeared to be an attempt to bring the examination of schools under the ægis of the universities and as such was a movement which he thought ought to be encouraged. He then read a draft letter which he had prepared in reply.

The Council went into committee to consider this draft.

On resuming, it was unanimously approved, and the letter ordered to be sent.

REPORT OF EXAMINATIONS.

July, 1882.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (12th)	7	3	4
„ (13th)	7	3	4
„ (19th)	6	2	4
	—20	— 8	—12
Minor (12th)	20	5	15
„ (13th)	20	6	14
„ (14th)	26	13	13
„ (19th)	21	8	13
„ (20th)	23	12	11
„ (21th)	25	14	11
	—135	—58	—77
Modified (12th) . . .	1	0	1
	—	—	—
	156	66	90

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (20th)	2	1	1
Minor (20th)	13	12	1
„ (21st)	14	7	7
	—27	—19	— 8
Modified (21st) . . .	1	1	0
	—	—	—
	30	21	9

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
July 4th	370	189	181

Four certificates received in lieu of the Society's examination:—

2 College of Preceptors.
1 University of Aberdeen.
1 University of Cambridge.

EXAMINATIONS IN SCOTLAND.

It was resolved that the examinations in Scotland in 1883 should take place in January, April, July and October.

THE COUNCIL MEETING IN SEPTEMBER.

The PRESIDENT announced that although summonses would be issued for a Council meeting in September it was not intended to form a quorum.

Erratum.—In the list of persons who passed the Minor examination on the 20th of July, page 93, column 2, after line 36, insert,

Thomas, John Henry .....Chester.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

FELSPAR AS A SOURCE OF POTASH ALUM.*

BY JOHN SPILLER.

The aim and objects of this Society, as I understand them, will be not only to record the steps of progress made in actual chemical manufacture but to take account of "wasted ingredients," with a view to their possible economization in the future. It is under this latter head that I beg leave to offer a few suggestions bearing on the manufacture of alum, which have been sufficiently confirmed by laboratory work to prove my case, although I do not pretend to have turned them as yet to practical account.

Starting from felspar and the large class of rocks in which it is contained, such as granite, gneiss, porphyry, syenite, greenstone, mica-slate, and the basaltic rocks which together constitute a large proportion of the earth's surface, we find a mineral occurring which contains *more potash and alumina* than is present in common alum. If, then, in this native double silicate we could replace the SiO_2 by SO_3, we pass at once from insoluble felspar to alum. Every chemist knows of the method of decomposing silicates in mineral analysis by attacking them with hydrofluoric acid; but as it was my object to prepare a *sulphate*, and to work as cheaply as possible, I employed a mixture of fluorspar, felspar, and sulphuric acid. Alum is formed together with calcium sulphate and the gaseous fluoride of silicon. The last-named gas, passed into water, gives a finely-divided silica—most useful as a polishing powder—and hydrofluosilicic acid, for which there is already occasional use in the arts. Comparing now the percentage composition of felspar and alum, and taking for the former the mean of three analyses published by Watts ('Dictionary of Chemistry,' vol. ii., pp. 620–621) we get for common felspar, "orthoclase":—

	Alumina.	Potash.
Stolberg (Rammelsberg) . .	16·98 . .	14·42
Lomnitz (Valentine Rose) .	17·50 . .	12·00
Chamounix (Delesse) . . .	19·06 . .	10·52
Mean	17·85 . .	12·31

Or, together, say over 30 per cent. of ingredients useful in the manufacture of alum, which salt, when crystallized, contains only 10·83 per cent. of alumina, and 9·91 of potash; or 20·74 per cent of total bases. This looks hopeful from a manufacturer's point of view; for, taking the potash as regulating the yield, 100 parts of felspar should give nearly 124 parts of crystallized alum; and if the relative deficiency of alkali were supplied, then the yield (calculated from alumina) should be as high as 165 per cent.

In my own experiments I have not succeeded in getting more than an *equal weight*, but I have been working under disadvantage with samples of coloured felspar containing a considerable quantity of iron. From a piece of white granite I have obtained a fair quantity of alum, with very much less iron in solution; and to this point I had arrived when my attention was directed to a previous publication of the fundamental fact in the *Bulletin de la Société Chimique de Paris* for June 7, 1872. The particulars are as follows: At the Paris meeting M. Lecoq de Boisbaudran was describing a process for the extraction of cæsium and rubidium from lepidolite. He attacks the mineral with hydrofluoric acid, and separates the caesium and rubidium by taking advantage of the difference of solubility of the bitartrates. Then M. Guignet, in the discussion, says he "thought it might be possible for this extraction to utilize the action of *sulphuric* acid, and separate the alkalies in the state of alums, this proceeding having been used by him to extract the potash from felspars." The brief terms of this report (three lines only) do not afford much information, or make it clear that M. Guignet ever worked with a mixture of felspar and fluorspar, but he evidently aimed at economizing the potash in felspar, and may have succeeded in so doing.

Much more pertinent to this part of the subject are the experiments of Mr. F. O. Ward and Captain Wynants, who, in December, 1857, took out a patent for what they called the "Calcifluoric Attack." A full account of this process appeared in the "Reports" by the Juries of the International Exhibition, 1862, class ii., pages 50 to 54; and later, a company was formed to put it in operation at Connah's Quay, near Flint. The object seems to have been to extract potash from the primitive rocks rather than to make alum; but I am bound to say that the inquiries I have made (with the kind assistance of Mr. Eustace Carey) seem to show that the production of potash from the felspathic rock

* Read at a Meeting of the London Section, March 13, 1882.

was anything but a commercial success. Had it been worked continuously on a large scale, who knows but that we might have had by this time vast stores of lithium, cæsium, rubidium, and perhaps other yet unknown alkali-metals, concentrated from the by-products of such a manufacture?

Reverting now to my own experimental results, two or three points of practical interest may be mentioned.

1. I find it necessary to get rid of the excess of sulphuric acid by thoroughly heating the decomposed mass in a current of air before dissolving, on account of the extraordinary increase of solubility of the alum in acid liquors.

2. When granite is attacked by the nascent HF, the felspar and mica disappear long before the admixed quartz, most of the latter remaining in the residue.

3. The employment of sheet-lead vessels is not to be recommended, for the cost is great and the low fusion point of the metal restricts too much the degree of temperature which it is needful to apply in order to expedite the decomposition.

When the treatment is successfully accomplished there is the large amount of calcium sulphate to be dealt with, left as a bulky residue on treating with water. It struck me, therefore, that it would be more advantageous to use the mineral cryolite ($3NaF, Al_2F_3$), which is so plentiful in Greenland, in place of fluorspar as previously described. This would augment the amount of aluminic sulphate formed at the same time that it supplied the needful fluorine. Here, again, Persoz, Sauerwein, Thomson, and others have described the manufacture of crude alumina salts from cryolite *per se*, but none of these processes include the idea of making the hydrofluoric acid available for decomposing the native double silicates of potassium and aluminium mixed therewith. The relative proportions in which the felspar rock and cryolite have to be employed, as also the amount of sulphuric acid required, must be dependent upon the nature of the rock operated upon, the amount of admixed quartz, etc., and could be easily determined by making a few preliminary experiments upon a fair average sample of the rock about to be treated. A warm hearth, made slightly hollow, and lined with fire-bricks, or slabs of the rock itself, gently heated by reverberatory action, will probably be the best construction for conducting the operation on a manufacturing scale.

Next, as to the varieties of granite and porphyry which are likely to yield the highest percentages of potash, there are displayed in the Museum of Practical Geology about a hundred polished samples, which I have lately been to inspect. Amongst these I find that the granite from the Duke of Argyll's quarries in Mull appears to consist almost entirely of rose-coloured felspar. The blocks from the Mourne Mountains, County Down, are mostly white felspar; and large crystals of the same are seen in the white granites from Lanlivery (Cornwall), St. Barule (Isle of Man), and in the specimens from Castlean (near Penzance), and Lundy Island. Rubislaw and Cove (Aberdeen) produce almost pure felspar, containing 13 per cent. of potash. Peterhead granite is rich in felspar, but it is highly coloured with ferric oxide.

I am indebted to Professor J. S. Brazier, of the University of Aberdeen, for much valuable information respecting the granite quarried in his neighbourhood, and he has kindly sent me some of the waste chippings and *débris* from Messrs. Macdonald and Field's huge turning-lathes, such material as is used for mending the roads, but the small sample sent was a variety of grey granite which did not happen to contain much potash. More interesting information is contained in a letter which I am permitted to append.

Letter from Dr. Alexander Cruickshank to Professor Brazier.

"I have much pleasure in answering, as far as I can, your inquiries of February 4. In a note at bottom of page 265, vol. xxviii. of the *Transactions of the Royal Society of Edinburgh*," published 1877, in an elaborate paper on the "Felspars of Scotland," Professor Heddle, of St. Andrew's University, says: 'I find the grey granite of Aberdeen to consist of a great deal of oligoclase, little orthoclase, little quartz, very small quantities of muscovite (potash mica), and a good deal of Haughtonite (a new variety of mica).'

"In this paper Professor Heddle gives new analyses of oligoclase and orthoclase, and in vol. iii. of the *Mineralogical Magazine*, page 81, he gives an analysis of Haughtonite, while an analysis of muscovite is given in Professor Nicol's 'Mineralogy.'

"From these analyses I extract the percentages of potash in the minerals composing our granite.

	Contains. Per cent. K_2O.
Oligoclase, from Rubislaw Quarries . . .	3·77
Oligoclase, from Scolty Quarries	4·73
Oligoclase, from Dyce Quarries	1·34
Orthoclase, from Rubislaw Quarries . . .	13·05
Muscovite	11·80
Haughtonite, from Cove, near Aberdeen .	8·81

Mean, 7·15 per cent. of potash (K_2O).

"There is a rock called compact felspar or felstein (a mixture of orthoclase and quartz, says Professor Nicol, in his 'Mineralogy'), forming beds in the gneiss rocks, about half way between the Bay of Nigg and the Cove. It also occurs in a large mass on the Muchall's coast, where it is used for 'metalling' the Stonehaven Road. Again, it occurs near the top of Cairn William Hill, near Monymusk. I remember Dr. Shier telling us in the natural history class at Marischal College, forty years ago, that the compact felspar from some of these localities had been tried in the English potteries. It was found, however, to contain too great a percentage of silica for the purposes intended.

"I have long understood that the scrapings from the roads about Aberdeen (which are metalled with broken granite mixed with sand) are valued as a potato manure, from the large quantity of potash they contain.—Yours, etc.,

(Signed) "ALEXANDER CRUICKSHANK."

The whole subject appears, therefore, well worthy of extended investigation; and, like as the American potashes have been displaced to a great extent by the Stassfurt salts (native forms of KCl, sylvine, and carnallite), so, in time, it may chance that British sources of potash will take the place of the German supplies. On the commercial policy I beg to refer the members of this Society to the interesting column on page 25 of our new journal, wherein Dr. Grüneberg asks and argues the question: "How far would a Reduction of the Price of the Crude Potassium Salts give Impetus to the Consumption of the same in the Chemical Industries?"

Parliamentary and Law Proceedings.

DEATH FROM CHLOROFORM.

On Saturday, Mr. Carttar, West Kent Coroner, held an inquest on the body of Grace Harriet Butcher, aged 20, wife of Herbert Butcher, a medical student, of Turret House, Avenue Road, Bexley Heath. On Thursday night the deceased retired to bed, suffering from toothache, and to relieve the pain her husband rubbed some chloroform on her gums with his finger. He returned the phial containing the chloroform to the dressing-case, which he locked, placing the key in a different place to that from which he had taken it. He then retired to rest himself, and was not disturbed during the night by his wife, but on being called at seven o'clock the next morning he found Mrs. Butcher lying dead by his side, with her face on the pillow, his silk handkerchief in one hand, and the empty chloroform phial, which was two-thirds full overnight, in the other hand. She had been dead four or five hours.

The husband said he was a very heavy sleeper, but a candle was left burning in the bed-room all night.

Dr. N. A. Barrington said that he had made a *post-mortem* examination, in conjunction with a medical man

who attended on behalf of deceased friends, and found the body well nourished, and the organs generally healthy, but the heart was flabby, showing deceased was not a good subject for receiving chloroform. The appearances were quite consistent with the history of the case as given in evidence. The death was due to excessive inhalation of chloroform. The bottles on the mantelpiece contained nothing that would account for the death of the deceased.

The jury returned a verdict, "That deceased died from misadventure through inhaling an overdose of chloroform, in attempting to gain relief from toothache." —*Morning Post.*

Poisoning by Laudanum.

An inquest has been held at Malton on the body of John Collier, until lately a master printer and stationer in the borough. The evidence showed that deceased had committed suicide by taking a large dose of laudanum. The jury returned a verdict of "Suicide whilst in a state of unsound mind."

Correspondence.

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

The Future of Pharmacy.

Sir,—Your correspondent, "Pillmaker," has evidently been exercised with the problem which perplexes many minds, as to how a chemist is to get his living. Emerson has condensed the philosophy of it into a sentence—"Make yourself necessary to the world and mankind will give you bread."

"Pillmaker" seems to think that what the world wants is somebody to break the government stamp and retail Parr's pills in small quantities. That process would convert us from "pill makers" into pill vendors, and herein we should be at least a quarter of a century behind the hucksters, who have done this very thing for many years. Some of them have been aided and abetted by the supply of locally manufactured Parr's pills (I do not refer to any special neighbourhood), which never had a government stamp to be broken. In these cases the purveying chemists were pill makers—with a qualification.

But, sir, are we not fast becoming, if we are not already become, mere brokers of nostrums and openers of packages? The art of dispensing threatens to be simply the knowledge of the size of bottles, the ability to read the English label of an extract that must be procured in a particular town, and the capacity to count twelve small beans, supplied only, say from Kentucky. It will soon be time for some of the faculty to hold themselves forth to the public as merely advisers as to what quackery their patients should adopt, and instead of giving up their "dispensing" to chemists, they might well dress up their page boys and set them to hand over to their clients the packages as imported. The sham would at least stand acknowledged, and there would be a gain of truth to the world. It would be quixotic to attempt the subversion of such established remedies as Battley's solution or Brown's chlorodyne; but if in some town of adequate importance a bond of union could be formed sufficiently strong, and if there were courage bold enough for all the chemists in the town to refuse to dispense chemical and pharmaceutical preparations of definite composition, under cover of any person's label, and to maintain their sole and individual responsibility for all the medicines they prepare, an example would be set, and an illustration given, which would go some way to prove to the public, that not the nostrum, but the chemist is "necessary to the world"—*quod est demonstrandum.*

Ryde. Henry H. Pollard.

Sir,—I doubt very much if "Pillmaker's" scheme of buying the largest size of the most extensively used patents, and retailing them in small quantities, will ever be generally adopted. He proposes that chemists should measure and label patents, and thinks that outsiders would not care to spend so much time. Would any respectable chemist have the name of some new and much puffed patent on the same label with his own name and address? Of course there may be exceptions, but as the President of our North British Branch once said, "I find them in bad company."

I have no sympathy with chemists "cutting" patents. The huckster may charge 10*d.*, but the chemist's price ought to be 13½*d*; by "cutting" he puts himself on "level terms" with such indifferent traders.

Regarding the general sale of the commoner drugs, I think the chemist who is "true to the interests of the trade" has little to fear. The other week, a lady customer came into my shop, to ask the price of chemical food; she said she got it at so-and-so's for so much. I assured her that the genuine article could not be bought wholesale at such a low figure, succeeded in getting her order, and have supplied her since. Keep drugs of standard purity only and there is no fear of our customers going elsewhere for salts or cream of tartar.

Edinburgh. John.

Leeches.

Sir,—For the past four years I have been trying experiments as to the preservation of leeches. Many means have been devised from time to time in the Journal, but few have been very successful. My plan is as follows:—I have one of Maw's bell-shaped aquariums half filled with water, also a few rough stones, about half a dozen in number and about the size of an orange. The water is changed twice only in twelve months. My object in doing this is because the temperature is varied but very little, and that very gradually, whereas when the water is changed once or twice a week, especially in winter, it is like transferring them from a warm to a very cold climate, and frequently I hear the complaint of chemists losing so many just after changing the water. I keep my aquarium in the shop, and although the water is only changed twice in a year, it is never foul but only has a slight fishy smell. Anyone adopting this plan will find it much to their advantage. When the stock of leeches is reduced to six in number, and before putting a fresh stock in the aquarium, I take out those six, as I find that they are just similar to bees, that is, when a stranger enters the hive they immediately pounce upon it and destroy its life; so it is almost the same with leeches.

I have lost three leeches only in four years.

Devonport. J. A. Lamble.

J. Hickisson.—We are unable to comply with your request.

A. P. B.—You do not say what difficulty you experience in dispensing the prescription.

W. Wilkinson.—The question could only be determined after an examination of the precipitate.

Messrs. Wills and Wootton.—Your letter has been handed to the Secretary. A correction will be found in the official report on p. 118.

Cariad Raddy.—According to the recent researches of Mallet (*Phil. Trans.*, 1880), in which special care was taken to eliminate the influence of occluded oxygen, the atomic weight of aluminum is 27·019, taking oxygen at 15·961.

T. W.—Aqua menthæ viridis. See Disp. Mem., No. 101, *Pharm. Journ.*, [3], viii., 850.

Lux.—The formula has already been asked for more than once in this Journal unsuccessfully.

A. F. Sainsbury.—(1) Proctor's 'Lectures on Pharmacy;' (2) Gray's 'Supplement to the Pharmacopœia,' or Cooley's 'Cyclopædia of Practical Recipes.'

Communications, Letters, etc., have been received from Messrs. Davis, Proctor, Ronchetti, Macdermott, A £2 Victim, Wulfruna, Magister, J. E. J.

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"New York Medical Journal," *August* 1880, Dr. F. Weir, *in Lecture delivered to the College of Physicians and Surgeons, New York.*

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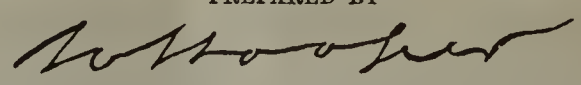

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Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

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The London Hospital and Medical

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At the Examinations held in June the following Students of this School were successful.

MAJOR.
*Mr. W. A. Shephard.

MINOR.

*Mr. W. H. Dangerfield.	*Mr. T. W. Lowther.
* ,, J. T. Hall.	* ,, E. Wilkins.

At the July Examinations the following Minor Students from this School were successful.

Mr. S. Allen.	*Mr. J. Meadows.
* ,, W. Evans.	,, W. Pearson.
* ,, A. Hall.	* ,, W. H. Thomas.
* ,, C. Hanson.	* ,, H. H. Townsend.
* ,, T. S. Hodgson.	* ,, J. R. Wood.
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* These Students passed the first time of presentation.

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LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XVI.

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy.

The next Session will commence on

FRIDAY, SEPTEMBER 1st.

FEES

PRELIMINARY	One Month	£2 2s.
	Until Qualified ...	£5 5s.
MAJOR or MINOR (*From September 1st*).	October Exam. ...	£4 4s.
	December ,, ...	£8 8s.
	Until Qualified ...	£10 10s.
MAJOR AND MINOR .	Until Qualified ...	£15 15s.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

The soundness and thoroughness of the education is demonstrated by the fact that half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College, *e.g.*,

London Minor Examination, June, 1882.

From the **Westminster College** the following 9 passed:—		From all **Other Schools Combined** the following 7 passed:—	
Arkle, C. A.	Coates, U. A.	Bird, F. C. I.	Hall, J. T.
Coombs, W. T.	Humphries, J.	Dangerfield, W. H.	Lowther, T. W.
Elton, T. F.	Ricketts, J.		Mills, A. E.
Hill, A.	Spencer, G.	Darch, A.	Willcocks, A. S.
Thompson, C. L.			

Examinations held in London, July, 1882.

135 Minor Candidates were examined; 77 failed; the following 58 passed:—

From the **Westminster College** the following 35 passed:— Messrs.		From all **Other Schools Combined** the following 23 passed:— Messrs.	
Bowering	Noble	Allen	Pearson
Cave	Norburn	Dillon	Ransom
Comer	Northen	Evans	Thisleton
Cullwick	Parker	Greenhall	Thomas, J. A.
Daniel	Pellew	Hall	Thomas, W. H
Eley	Pickering	Hanson	Townsend
Evans	Pinder	Harston	Tyson
Foggitt	Rodmell	Hodgson	Waymouth
Frost	Rowland	Hornby	Wheeley
Gaskin	Sergent	Meadows	Williams
Hankinson	Shapcott	Miller, F.	Wood
Hewlett	Thomas	Mitten, Flora	
Hickson	Warburton		
Innes	Weddle		
Loam	Wellburn		
Longtoft	Wells		
Mann	Worts		
Nichol			

In order to secure the comfort of Students during their stay in College, Mr. Wills (Principal) has made arrangements to provide a limited number of Students with Board and Lodging at his Private Residence, Gladstone House, St. George's Road, Southwark.

Terms, One Guinea per week.

For Revised Prospectus and further particulars apply to

Messrs. WILLS & WOOTTON

TRINITY SQUARE, LONDON, S.E.

THE MANCHESTER COLLEGE OF PHARMACY

225, Oxford Street,* Manchester.

Specially adapted to supply the needs of Pharmaceutical Students. The system of *Class Work* and *individual attention* ensures students thoroughly understanding their subjects. Mr. W. S. Turner has often been told that his explanations have rendered intelligible subjects that have been puzzled over in books only for months.

Fee from NOW to October Examination, Minor or Major, £9 9s.

Evening Classes to commence as soon as possible, Minor or Major, 3 nights each per week.

Full particulars, see new circulars.

* Until lately the Class Rooms of L. SIEBOLD, Esq., F.C.S.

MR. J. S. WARD, Ph. Ch. and Prize Medallist, 36, Oxford St., Liverpool, having a Private Pupil for the October Minor examination, will be glad to meet with another gentleman to join him (in-doors). Anyone tolerably well prepared will find this an excellent opportunity for passing at a very little expense. Particulars on application.

ENGAGEMENTS WANTED.

A HOLIDAY ENGAGEMENT. Minor qualification. H., Mabel House, Clarendon Rd., Walthamstow.

AUSTRALIA or New Zealand.—A gentleman who has had 16 years' experience in the best Chemist's shops in the north, during 9 of which he has been either Manager or Principal, is desirous of an engagement in either of the above colonies. Unexceptional references, both for business ability and personal character. Age 31. Minor qualification. Married. 2 children. J. H., care of Messrs. James Woolley, Sons & Co., Manchester. P.S.—Good Veterinarian.

MANAGER or ASSISTANT, with prospect of succeeding in a few years. Age 25. Minor qualification. Acting as Manager at present. Brighton and country experience. HARDING, Low St., Banff.

IMMEDIATELY.—As ASSISTANT. In-door. Age 25. Height 5ft. 7½in. C. E. C., 83, High St., King's Lynn, Norfolk.

AS JUNIOR in a good Retail and Dispensing business. Out-door. Height 5ft. 10in. Age 20. 5 years' good experience. For references, &c., W., 105, High St., Cowes, I. of W.

AS JUNIOR. 8½ years' experience in light Retail and Dispensing. Age 23½. Total abstainer. Salary £40. In-door. Permanency. Unqualified. DELTA, 10, King St., Dover.

AS ASSISTANT. Town and country experience. Age 24. Good references. Apply, with usual particulars, salary, &c., to CONIFERÆ, Mr. Postil, Foxholes, Ganton, York.

A FIRM of country Chemists wish to recommend their Assistant, who is leaving them, as MANAGER of a Branch, or to a somewhat similar post. Apply in first instance to X. B., Messrs. Hearon, Squire & Francis, 5, Coleman St., London, E.C.

WHOLESALE.—Of trust. In London. Thorough acquaintance with practical Pharmacy and Book-keeping. Satisfactory references, &c. G. E., 222, St. Paul's Rd., N.

AS Junior ASSISTANT. Mixed country business. 5½ years' experience. Age 19½. Height 5ft. 8in. Salary £25. F. ROBINSON, 50, High St., Longton, Staffs.

ENGAGEMENTS WANTED.

A FRENCH Chemist, not speaking English, wishes to find a situation, for about 2 years, as ASSISTANT. Would be satisfied with a small salary. C. E., Wilcox & Co., 239, Oxford St., London.

AS ASSISTANT. Temporary or otherwise. Age 30. Thoroughly experienced. Now disengaged. CHEMICUS, 231, New North Rd., London, N.

JUNIOR ASSISTANT. In a good country town. Salary not so much an object as a comfortable home and good opportunity for improvement. Highest reference. W. H. PITTEN, 3, George St., Pontypool.

LOCUM TENENS.—By the day, week or month. Town or country. Disengaged from Aug. 14th to 25th, and again on Sept. 11th. W. D. FORSTER, 6, Manchester St., Gray's Inn Rd., W.C.

AS ASSISTANT. 11 years' experience in Dispensing, Prescribing and General Mixed business. Now disengaged. J. H. I., 7, North Parade, Lincoln.

AS JUNIOR in a good class Dispensing business, where 2 assistants are kept. Age 19. Nearly 4½ years' experience. Height 5ft. 8½in. A. F. LAWRENCE, Market Hill, Cambridge.

A FRENCH Chemist, 23 years, with 7 years' experience, speaking Italian and English, wishes to obtain a situation in a good English pharmacy. Good references. S. HONORÉ, 234, Richmond Rd., Hackney.

BY Advertiser, in West-end, where he would acquire knowledge of Retail. 12 years' Wholesale experience. Excellent reference. X. Y. Z., 30, Park St., W.

IMMEDIATELY.—As ASSISTANT SURGEON preferred. In or out-door. Fair Dispenser, good Prescriber and Extractor. Letter only, to ALPHA, Mr. H. A. Schemb, 351, Upper St., Islington, N.

AS DISPENSER, or the MANAGEMENT of a Surgeon's Retail, by a married man. Good references as to personal character and experience. Permanency preferred. F. COOKE, 10, The Terrace, Tonbridge, Kent.

AS IMPROVER. Over 2 years in the trade. Passed Prelim. Age 18. A. B., 192, Lambeth Rd., London, S.E.

AS ASSISTANT. Age 21. Minor qualification. Good experience in light Retail and Dispensing. WM. PEARSON, Sinderland Green, near Altrincham, Cheshire.

AS JUNIOR in light Retail and Dispensing business. Short hours. Others kept. 3½ years' experience. Age 21. Height 5ft. 8in. G. I., Chemist, Aldeburgh, Suffolk.

AS ASSISTANT, in London. 8 years' experience. Age 23½. Height 5ft. 10in. Salary £45. Mr. CHARLES BELL, Post Office, Wellington, Salop.

BY a Temporary ASSISTANT. At once. For a few weeks or less. Good references. Can Extract Teeth. Terms moderate. Ætat. 22. Height 5ft. 9in. REPSILON, Mr. H. Sivell, 35, New Park St., Devizes.

AS JUNIOR. In a business where more than 1 kept preferred. 3 years' experience. W., 16, Merrick Sq., S.E.

ASSISTANTS WANTED.

APPRENTICE.—In a good country business near London. A comfortable home for a well educated youth about 16. Premium moderate. Apply to M. P. S., care of Messrs. Edwards & Son, 157, Queen Victoria St., E.C.

MANAGER, out or in-door, trustworthy and experienced, capable of Prescribing and Extracting Teeth, for a Mixed business, in a thickly populated neighbourhood. Liberal salary. Apply by letter, C. HENRY, Post Office, Crawford St., Bryanston Sq., W.

ASSISTANTS WANTED.

MESSRS. EKIN & APPLEBY, Pharmaceutical Chemists, Bath, have a vacancy for a PUPIL.

THE General Infirmary at Gloucester and the Gloucestershire Eye Institution.—A non-resident DISPENSER. Should possess the Minor qualification. Applications, stating salary required, with testimonials, to be forwarded to the Committee on or before Wednesday, August 23rd.

WEST Indies.—ASSISTANT, in a Drug store. Must have some knowledge of Drugs, and be a good Salesman. Need not necessarily be qualified. Apply by letter only. H. C., care of Davy, Yates & Routledge, 64, Park St., Southwark, S.E.

APPRENTICE.—H. W. HARRIS, Pharmaceutical Chemist, Rochester, has a vacancy for a well-educated and gentlemanly youth, who has passed, or is prepared for, the Preliminary examination. Full particulars on application.

AT once.—A thoroughly competent ASSISTANT. State age, height, and salary. Must produce good references. OLDERSHAW, Dispensing Chemist, Market Pl., Nottingham.

A JUNIOR or IMPROVER, for a Dispensing business, and to assist in Postal duties. Apply, with full particulars, JOHN BAMFIELD, Dispensing Chemist, Post Office, Alma Vale, Clifton.

A JUNIOR ASSISTANT, for a light Drug business. Must have good references. No Sunday work. One acquainted with Dentistry preferred. Address, T. C. TURTON, Bridge Gate, Howden, Yorks.

AN ASSISTANT, in-doors, in Surgeon's Retail. Must be a quick and competent Dispenser. Apply personally to O. C., 19, Eccleston St., Pimlico.

AN ASSISTANT for the Retail counter in a good Retail and Dispensing business (Store price). Apply by letter, giving full particulars, D. P. ROBERTS, 46, North End, Croydon.

A COMPETENT ASSISTANT, for a light Retail and Dispensing business. With qualification preferred. Apply to PHARMACIST, 45, Buckingham Palace Rd., S.W.

SENIOR ASSISTANT (out-door), in a leading town in the north of England. Address, with particulars, references, and stating salary required, F. C. S., care of Mr. Richard Bremridge, 17, Bloomsbury Sq., W. C.

ABOUT September 10th.—Qualified ASSISTANT, of 22 or 23 years of age, in a light Retail and Dispensing business. Must be a quick and accurate Dispenser, and have had at least 4 years' practical experience in a good pharmacy. State full particulars as to age, height, and salary required (in-doors). Satisfactory references essential. G. BROWN, Pharmacist, Sandown, Isle of Wight.

A COMPETENT, steady, and trustworthy ASSISTANT, either in or out-door. Middle-aged preferred. Apply to W. P. HADFIELD, Pharmaceutical Chemist, 26, Market Pl., Newark.

A JUNIOR. Out-door. Early in September. With experience in a first-class business. State terms and usual particulars, enclosing carte. WHITFIELD, Scarbro'.

IMMEDIATELY.—In Dispensing and Retail business. In-door ASSISTANT. Age 21 or 22. 1 only kept. Dwelling house apart from business. State full particulars, salary required, &c., to T. Fox, Chemist, Great Malvern.

A TRUSTWORTHY ASSISTANT, of sober and industrious habits, for a country Retail, Dispensing, and Prescribing business. Light hours. No Sunday work. Time allowed for study. Apply, with full particulars, stating salary required, and enclosing carte, to Mr. H. V. TELFER, Chemist and Dentist, Bruton, Somerset.

ASSISTANTS WANTED.

TO MANAGE a Business. Age about 30. Single. An opportunity of purchasing in 2 or 3 years. Apply to THOMAS FORE, Chemist, Birkenhead.

JUNIOR or IMPROVER, in light Retail and Dispensing business. Hours, 8 to 8, except market days. Residence away from business. Applicants will kindly state full particulars and enclose carte. B. COWGILL, 48, Manchester Rd., Burnley.

GAINSBOROUGH.—R. TEBBS is requiring, in a good Family and Dispensing business, an ASSISTANT. Apply, stating age and salary, to R. TEBBS, Chemist, Market Place, Gainsborough.

MANAGING ASSISTANT, for one of the principal Italian cities. Minor qualification. Knowledge of French necessary. Apply to HEARON, SQUIRE & FRANCIS, 5, Coleman St., E.C.

ASSISTANT, for Demerara. Must be a good Dispenser and of unimpeachable character. Apply by letter only, stating age, qualifications, &c., to K. J., care of Davy, Yates & Routledge, 64, Park St., Southwark, London, S.E.

AN earnest, Christian young man, of gentlemanly manners, about 20, to Dispense, &c., desirous of helping in Medical Mission Work. Duties light. Comfortable home. Time for study. Salary moderate. Enclose photo. (returnable) and full particulars to MEDICUS, 54, Coney St., York.

A JUNIOR or IMPROVER, in a first-class country business. One wishing for time to study, and would accept that as part salary, would be entertained. Address, with usual particulars, to COUNTRY, care of Messrs. Hodgkinsons & Co., 198, Upper Whitecross St., London.

AN ASSISTANT, about 25 years of age, to Dispense and take charge of a Surgeon's Retail. One accustomed to town trade preferred. Apply to H. KAY, Surgeon, 311, Commercial Rd., E.

AN experienced and qualified MANAGER, requiring a permanency. Apply or address, with full particulars and photo., to E. S. P., 25, Aigburth Rd., Liverpool

TO Parents and Guardians.—A respectable well-educated youth as an APPRENTICE. Comfortable home, and every facility for thoroughly learning the chemist's business. Apply, ROBT. G. GOULD, Chemist, Andover. A Turnover or Improver treated with.

A RESPECTABLE and trustworthy ASSISTANT, to assist in shop and to act as Town Traveller Must be well recommended by previous employers. Address, stating age and salary required, with usual other particulars, to J. B. L., care of Wyleys & Co., Coventry.

AT once.—As Second ASSISTANT. Age about 22. Minor or Hall qualification. Experienced Dispenser. Good writer. Hours of business 8 to 8.30. Allowed 1 evening a week and whole of every other Sunday. Salary £45. Useless writing. Must apply personally, mornings 10 to 12, evenings 6 to 8. D. WHITE & SON, 19, Park Ter., Regent's Park.

APPRENTICE.—CHAS. H. RIDLEY (successor to Wimble & Co.), Wholesale Druggist and Family and Dispensing Chemist, Maidstone, has a vacancy for a respectable, well educated youth as an APPRENTICE. Indoors. Premium required, but time for payment could be arranged.

FOR South Africa.—The first week in September. An experienced, qualified ASSISTANT. Unmarried. Not under 26. Good references indispensable. Apply for full particulars to C. J. Fox, 35, Addington St., Ramsgate.

IMMEDIATELY.—A young man, as ASSISTANT, for a Mixed country business. Apply, with carte stating age, salary required, &c., to MORGAN & SONS, Newtown, Montgomeryshire.

ASSISTANTS WANTED.

BRIGHTON and Hove Dispensary.—The Committee of Management hereby give notice that they will on Tuesday, the 22nd of August instant, at 12 o'clock precisely, examine certificates of qualifications and testimonials of moral conduct from candidates for the appointment of RESIDENT DISPENSER to this Charity, at a salary of £100 per annum, with furnished apartments, coals, gas, and attendance. The candidates must be members, or have passed one of the examinations, of the Pharmaceutical Society of Great Britain. Also must be above 24 years of age, and unmarried. The whole time of the dispenser is to be devoted to the Institution, and he must give three months' notice previous to leaving. Certificates and testimonials under seal, addressed to "The Chairman of the Committee of Management, Brighton and Hove Dispensary," must be delivered at the Institution, Queen's Rd., Brighton, on or before Monday, the 21st of August instant. The election will take place on Tuesday, the 5th of September next, at twelve o'clock at noon, and the successful candidate will be required to enter upon his duties on Tuesday, the 3rd of October next.

SOMERS CLARKE, Honorary Secretary.
J. W. STRIDE, Assistant-Secretary and Collector.
Board Room, Queen's Rd., Brighton,
1st August, 1882.

A GENTLEMANLY, trustworthy ASSISTANT, in a good country business. First-class references required. Address, MARK SMITH, Chemist, Louth, Lincolnshire.

A GOOD MINOR, used to a Mixed business. Must have first-rate references of ability, honesty, steadiness, and obliging manners. State salary, out. Send photograph and height. R. H. MAYS & SON, 3, Market Pl., South Shields.

MANAGER, about 30 years of age. Competent to take charge of a good business. Able to Extract Teeth, &c. Salary to commence £50 indoor, £90 out-door. References must bear investigation. Address, stating age, height, experience, &c., with carte, if convenient, M. P. S., 48, Brook Rd., Bootle.

A WELL educated youth as an APPRENTICE, or an IMPROVER. No premium. Apply to F. J. STANNARD, Post Office, Broad Green, Croydon.

FOR a large West-end business, a thoroughly efficient DISPENSER. Out-doors. Hours, 9 a.m. to 7 p.m. Apply by letter only, stating experience, salary, and references, to Mr. HALY, 39, Charing Cross.

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IMMEDIATELY.—Proprietor taking another business. Old established (50 years, and changed hands once) BUSINESS. Good-class Family Retail, Prescribing and Dispensing. Seaside village, Devon. No opposition. Good neighbourhood. Capital opportunity for young man to commence. Returns over £7 per week, and increasing; with attention soon doubled. Good house and splendid garden. Rent £25. Further particulars address (no agents), CHEMICUS, Mr. R. Nicholas, Wilton Rd., Salisbury.

LIVERPOOL.—In main thoroughfare of a good locality. A profitable Dispensing and light Retail BUSINESS. Good prices. Returns last year £500. Apply by letter only in first instance, to Mr. ECCLES, 10, Glover St., Birkenhead.

GENUINE Retail, Prescribing and DISPENSING. In village of 4000 inhabitants and rapidly increasing. No opposition. Full prices obtained. Shop handsomely fitted and well stocked. Returns £260. Cash price £250. Rent £30. Rates, &c., £4. House 8-roomed and good garden. Intending purchasers apply to J. JAMES, Chemist, Caversham, Reading.

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IMMEDIATELY.—In the West Riding. Light Retail and Prescribing BUSINESS. Full prices. Valuation or otherwise. Good stand and opening for Dentistry. Apply in first instance to Mr. BROADHURST, Napier Ter., Cemetery Rd., Sheffield.

AT once.—A ready-money BUSINESS. In healthy and commanding situation. N.E. Coast. Doing profitable trade. Returns £897. Price £550, or reasonable offer. Genuine bargain. Satisfactory reasons for disposal. Apply to J. T., Mr. Coates, Fawcett St., Sunderland.

SOUTH Coast.—Fashionable watering place. Dispensing and light Retail. Large shop. Good house. Present proprietor going abroad. Full particulars from A. Z., care of Messrs. Barclay & Sons, 95, Farringdon St.

FAMILY Retail, Dispensing and PRESCRIBING. Enjoying the leading position of good town, Lancashire. Returns are from £1500 to £1600. This very old and genuine business is open to most searching investigation. Goodwill £200. Stock and fixtures at valuation, about £900. BONA FIDE, Messrs. Burgoynes & Co., 16, Coleman St., E.C.

FIRST-CLASS Retail and DISPENSING. In good town, within 1 hour of town. About 15 new prescriptions per annum. Full prices for everything. Every investigation courted. Thoroughly genuine reasons for sale. Returns £900. Price £800. Fine plate fronted shop excellently fitted, and large and convenient residence. N.M., Messrs. Burgoynes & Co., 16, Coleman St., E.C.

SEASIDE summer and winter resort, Lancashire.—Light Retail, Dispensing and PRESCRIBING, with fine opening for Dentistry. Returns £500. Lease. Price £400. Mr. BRETT, Valuer, Leicester.

SNUG Country BUSINESS, near Stockport. No opposition for 2 miles. Excellent opportunity for young man or branch business. Best prices obtained. Will do £400 with care. Stock and fixtures at valuation. House attached. Very low rental. Improving healthy locality. Principally light Retail and Dispensing. A. GREAVES & SON, Chesterfield.

THE old established and profitable Retail BUSINESS, carried on for nearly 30 years by Mr. BENJN. ROBINSON, Pharmaceutical Chemist, Pendleton, Manchester, who is retiring. Apply direct.

GENUINE Chemist's Dispensing and Prescribing RETAIL. Plate-glass front. Corner position. Main thoroughfare. Returned last year over £500. Rent £36. Two appointments, value £80, secured if taken before August 19th. A week's trial allowed. Price £375. Address, BRENNAN, 16, Great Clowes St., Manchester.

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IMMEDIATELY.—The most handsomely fitted SHOP in Manchester. Doing good Retail and increasing Dispensing, at full prices. Splendid position. Populous neighbourhood. Convenient premises. Owner going into the manufacturing. The best business in the market, and should be seen. Apply, J. SOUTHERN, opposite the Assize Courts, Manchester.

THROUGH illness. Double-fronted corner SHOP with Post Office attached. Corner of 4 thoroughfares. Private and back entrances. Returns about £250 without P. O. Price £160, or offer. Address, J. M., Chemist, 1, Southbridge Ter., Croydon.

IMMEDIATELY.—A Retail and Prescribing BUSINESS, with Coal Agency attached. Average returns £5 weekly independent of agency. Proprietor going South. Cash price £150. A bargain. Apply, Z., Burdon Bldgs., 56, West Grainger St., Newcastle-on-Tyne.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—London, S.E. Handsomely fitted and well stocked Retail. Returning £1250. All cash. Full prices. Net profits £600. Rent £42. For £1000. N.E. Thoroughly genuine Retail. Returning £600. Full prices. £400. N.W. Totally unopposed. Returning £550. Good-class family Trade and P.O. £500, or offer. N. Returning £7 weekly. Main road. Only £150. Wilts. Family Retail Trade. Returning £800. Good house, garden, lawns. About £700, or offer. Northamptonshire. Returning £800. Totally unopposed. Full prices. Excellent house and garden. £500. Cheshire. Exceptionally profitable Retail and Dispensing Trade. Returning £1000. Net profits £450. Price £900, and part can remain. Sussex. Family Retail Dispensing Trade. Returns £700. Rent £30. Good house. Only £550. Surrey. Through illness. Same hands 10 years. Returning £5 weekly. £65. Apply, 30, Jewry St., Aldgate, City.

WANTED TO PURCHASE.

A WELL established Chemist's Business, in or near London. Cash £300 or £400. Must bear the strictest investigation. Send full particulars to M. B., London Institution, Finsbury Circus, E.C.

AN established Chemist's Business. In the suburbs of London. Returning from £700 to £1000. Send full particulars to A. B., 5, Hill St., Richmond, S.W.

FOR SALE.

SHOP Rounds, 8s. doz.; 12 Olive Green Ointment Jars, 24s.; Brown Ointment Pots, japanned covers, 8s. doz.; 3 Pear Shape Carboys, cut stoppers, 31in. high, with stands, 25s. each; 36 Black Stock Bottles, gilt caps, 1s. 6d. each; 12 Clear Glass Jars, elaborately labelled, gold covers, 15in. high, 8s. 6d. each, Fig. D; Perfume Bottles, Blue Jars, Fig. D, 12in. high, 8s.; Specie Jars, 80s. per pair, equal to new. E. Natali, 207, Old Street, Shoreditch.

FOR SALE.

A 12ft. Spanish Mahogany Counter, fitted under with drawers, £10; a 12ft. Plate-glass Case; fronted Counter, mahogany top, fitted under with drawers; a very elaborate fitting, about 22ft. long, Spanish mahogany and plate-glass, 10ft. high, a bargain; the entire fittings of a first-class chemist's, removed from near Sloane Street, to be sold, a bargain; also several Dispensing Screens, Glass Counter Cases, Desk and Cases, several flat top plate-glass Counter Cases, to open on top, very cheap. E. Natali, 207, Old Street, Shoreditch.

DENTISTRY.—H. Bradbury, Surgical and Mechanical Dentist, 19, Great Titchfield St., Oxford St., London, W. Established 1856. All kinds of Dental work supplied to Chemists and others practising Dentistry. Instructions given in Impression Taking, Fitting, and Articulating. Country orders receive prompt attention. N.B.—A vacancy for an out-door Apprentice or Pupil.

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HAVE THE FOLLOWING FOR DISPOSAL, VIZ.:—

1. London (Suburb).—Important thoroughfare. A good class Retail and Dispensing Business. Returns average £920 per annum. Profits about half. Several good Proprietary Articles. Good house, held on lease. Low rent. Satisfactory reasons for sale. A trial will be allowed if desired. Price £1000.
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4. London, N.—A nicely-fitted Shop. Thoroughly well stocked. In a rapidly improving neighbourhood. Only opened a month. Ill-health sole cause of sale. Price £220. Should be seen.
5. Somersetshire.—An old-established Mixed Business. Returns over £2000. Net profits about £600. Shop handsomely fitted and well stocked. Large convenient house and large garden. Rent £60, on lease. Price £400 for the goodwill, and the stock and fixtures at valuation. This will bear every investigation.

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Good established Business, in Birmingham, for £160. In every case write for lists.

Chemist's Shop Fixtures, standing in Shop in Birmingham. The entire Fittings of a West-end Shop, consisting of 15 doz. W. & N. mouth stoppered Rounds, Syrups, &c.; 18 6 lb. blue Ointment Jars; 18 8 oz. Pill Jars; 20 1 gal. black Stock Bottles (all ready labelled); 120 large and small mahogany fronted Drawers (labelled), on 20 ft. of lockers, and mahogany top on drawers; 3 mahogany Cupboards; 150 ft. mahogany edged Shelving; handsome Dispensing Screen, 6 ft. long, with mirror centre and case on each side, and silvered glass pilasters, with pedestal top at each end of screen, on which are mounted 2 handsome Specie Jars with gold covers; Serving Counter, 8 ft. long; mahogany Wall Case; mahogany Window Enclosure, 9½ ft. long, with gas fittings mounted with argand burners, &c.; 5 10 gal. handsome Show Globes, with cut stoppers; large street Lamp, with bottle lenses and bracket complete. The whole may be seen fixed in the above shop, and will be sold at a sacrifice to clear at once.

Midland Counties' Transfer Agency.

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Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—In consequence of the increased demand for Mr. BRETT'S services as a Valuer, it is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

F. J. BRETT has always on his Register between 200 and 300 Businesses in all parts, and at a wide range of prices. No PRINTED REGISTER issued, as experience has proved this to be so objectionable to Vendors.

NORTH WALES.—Old established light RETAIL, &c., in popular sea-side resort. Rent can be more than covered by letting. Returns £550. Price £350.

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The
Pharmaceutical Journal
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Transactions.

THIRD SERIES, No. 633] SATURDAY, AUGUST 12, 1882. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September. for the usual annual revision, and for repairs.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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The Society's Rooms will be closed from August 12th to September 11th.

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FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Thursday, October 5th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

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INSTRUCTION IN
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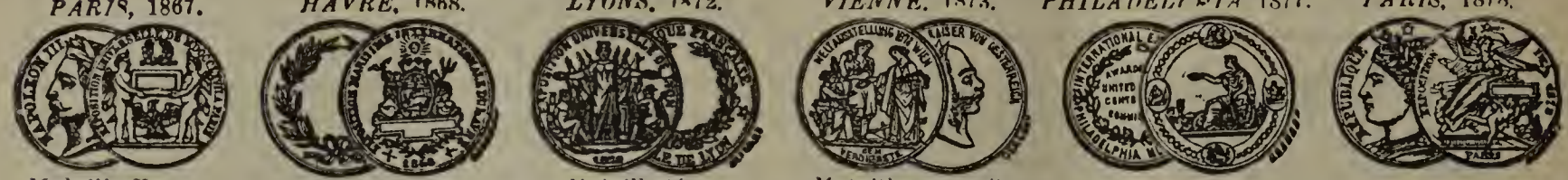

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Is neat, clean, and convenient for use. Being airtight & odourless, retains its strength unimpaired. In 1-lb., ½-lb., and ¼-lb Packages, packed into 24-lb Boxes and 50-lb. Cases, each separately, or the three sizes assorted in each Box or Case. Penny Packages, in 1-gross Boxes.

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J. & A. CHURCHILL, NEW BURLINGTON STREET, LONDON, W.

DR. J. COLLIS BROWNE'S

CHLORODYNE

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & Co., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

DEAR SIR,—Have the goodness to furnish us with your best quotations for Dr. J. COLLIS BROWNE'S Chlorodyne, as, being large buyers, we would much prefer doing business with you direct than through the wholesale houses. We embrace this opportunity of congratulating you upon the wide-spread reputation this justly-esteemed medicine has earned for itself, not only in Hindostan, but all over the East. As a remedy of general utility we much question whether better is imported into the country, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances, *ad infinitum*, of the extraordinary efficacy of Dr. COLLIS BROWNE'S Chlorodyne in Diarrhœa and Dysentery, Spasms, Cramp, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than COLLIS BROWNE'S, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than COLLIS BROWNE'S is a deliberate breach of faith on the part of the chemist, to prescriber and patient alike.

We are, Sir, faithfully yours,
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They will be found of the greatest use to all whose calling demands a close application of the eyes to their work.

Ladies will also derive great benefit from their use while reading or sewing by artificial lights.

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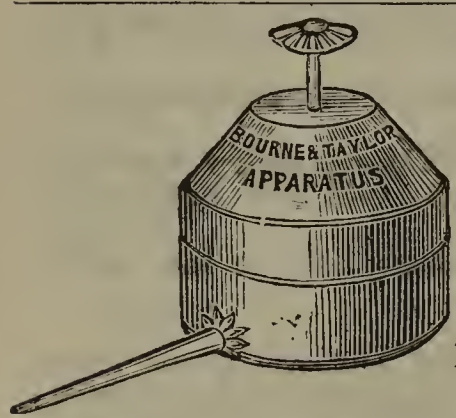

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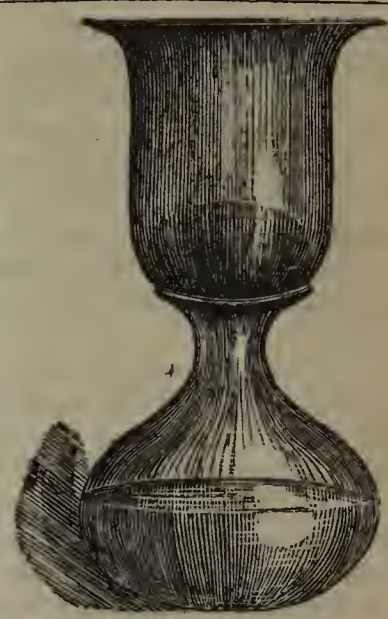

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(ESTABLISHED IN 1845),
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MADAGASCAR DRUGS.

BY E. M. HOLMES, F.L.S.

Although a list of the remedies used in Madagascar has already appeared in this Journal ([3], vol. xi., p. 853), and some remarks have been published concerning their uses (vol. xii., p. 669), no description has hitherto been given by which the various roots, barks, etc., might be identified should they hereafter enter into commerce. A considerable number, probably, do not possess active properties, and others are already well known. The remainder probably possess properties which may enable them to be turned to account in Madagascar as substitutes for European drugs, and on this account appear to merit such a brief description as will enable them to be distinguished from other drugs.

ROOTS.

Famamo or Fanamamo.—The root is woody, about ¾ inch in diameter in the upper portion, branched and tapering to ¼ inch or less, of a pale bright brown colour externally, and yellowish white within; the surface is rough with small paler warts of about the size of a pin's head.

The plant has been identified at Kew as *Mundulia Telfairii*, Boj., and belongs to a genus closely allied to *Tephrosia*, a genus which yields several fish poisons. It is for this purpose that Famamo is chiefly used, more especially in ponds or still waters. It is mentioned here because it may be presumed that it contains an active principle whose therapeutic properties might be worth investigation.

Fisava.—A small woody root, undulated and about the size of a goose quill, with a thin smooth bark, pale brown externally, but dark brown in transverse section. The taste is aromatic and bitter, somewhat resembling that of cardamoms. The meditullium is hard and woody, and minutely porous. The Malagasy name signifies "disperser of mist." It is used for headache.

Hazomafàna.—This drug consists of woody stems varying from ¼ to ½ inch in diameter, with a reddish grey, minutely wrinkled bark, speckled all over with white dots. The bark is thin, very tough and composed of fine silky fibre, and in aspect, acridity of taste and herbaceous flavour so closely corresponds with ordinary mezereon bark that there can be little doubt that it is the produce of a species of *Daphne* (possibly *D. viridiflora*, Wall.). The pounded bark is given in doses of 1 drachm, mixed with salt and ginger, as a purgative. It probably possesses similar properties to *Daphne Mezereum*, and would be worthy of a trial as a substitute for it in the native materia medica.

Hazomanga.—The specimen of this drug in my possession consists of a piece of whitish exogenous wood, the details of the structure of which cannot well be seen from having been mined in all directions by insects, a fact somewhat remarkable, since the wood has a strongly camphoraceous taste and odour and considerable pungency. It is used for indigestion.

Mahatatidy.—This drug consists of woody stem, about as thick as the little finger, with a thin whitish bark marked longitudinally with small ridges, the summit of the ridges being cracked so as to look like narrow elongated warts. A transverse section shows a very thin bark, in which minute crystals can be seen under a lens, and a white woody meditullium of ordinary exogenous structure. The taste resembles slightly that of pyrethrum, and has the same sialogogue effect. The name means "making to remember," an infusion of the plant being used to refresh the memory.

It probably belongs to the Rutaceæ, and might, perhaps, form a substitute for jaborandi in native materia medica.

Matsàtsorana.—Consists of pieces of stem about ¾ to 1 inch in diameter, with a hard, brittle, yellowish-brown bark, about two lines in thickness, smooth or marked with a few transverse rings and small oblong transverse warts and scars. The bark has a granular, and the meditullium a fibrous fracture, but owing to the cells being filled with starch, the structure is not easily seen, except that the white transverse surface under a lens is perceived to have scattered pores and numerous horny looking lines, transversely placed so as to form irregular zones, a feature by which it is easily recognized. The starch is peculiar, being oblong, spindle-shaped or irregularly angular, with a well marked longitudinal hilum, somewhat similar to the starch found in the Leguminosæ. The root has a faint aromatic odour and no perceptible taste, but is remarkable for its similarity in colour and general appearance to canella bark. It is used for dyspepsia.

Mainàkimàfy.—A woody plant about the size of the fore finger, with a pale brown wrinkled bark and an astringent taste. A transverse section shows a bark about two lines thick, having the reddish marbled appearance peculiar to rhubarb and other polygonaceous plants. When the bark is scraped with the nail it reveals a thin yellowish-brown layer immediately below the epidermis. The whitish woody meditullium exhibits the ordinary radiate and porous structure of exogenous roots. The root probably possesses astringent and alterative properties similar to those of the common dock.

Raìngeraìngy.—Is a tapering greyish-brown root, about 1 inch in diameter and 3 or 4 inches long, with a spongy pith and a radiated woody ring between it and the thin bark, the latter being of a brown colour and having a rough scurfy surface. It has no odour, but a taste between that of aconite and pellitory in character, which developes slowly. The plant grows in a valley south of Andrangoloaka. The leaves are stalked and imparipinnate, with three or four pairs of oblong crenate-serrate leaflets, cordate and unequal at the base. The leaflets are smooth above, but underneath the veins have scattered yellowish hairs, which occur also on the petioles and rachis. The flowers I have not seen, but the plant evidently belongs to the Umbelliferæ.

Raisàonjo.—This is a hard woody exogenous stem 1–2 inches in diameter, with a pale bright brown bark about one line in thickness. The wood, which is very hard, is seen under a lens to have numerous slender medullary rays. The bark is externally marked with transverse rows of oval or oblong warts, which, as the bark becomes older, run together into warty ridges. Internally it is pale and of a horny appearance. The taste, at first sweetish, soon becomes exceedingly acrid. It is given with "Ambilaza" in urinary diseases. It is called by the Malagasy, according to Dr. Parker, "Odinhèry," or the strongest "Ody" (charm or fetish). The plant has not yet been identified, but the character of the bark seems to point either to *Sapindaceæ* or *Euphorbiaceæ*.

Rovy.—This root is about the thickness of the forefinger, brownish-grey externally, slightly furrowed longitudinally, with a few transverse con-

strictions, each of which is marked by a crack on one side. The bark is whitish and spongy, and the yellowish woody meditullium is divided into numerous linear wedges by white medullary rays, easily discernible by the naked eye. The odour is somewhat earthy and the taste very bitter. In appearance and structure the root resembles that of some of the species of *Aristolochia* used under the name of guaco in South America. Possibly it may be the root of *Aristolochia acuminata*, Lam., the only species at present described as a native of Madagascar. (See Baker, 'Fl. Mauritius,' p. 322.) The root is used for indigestion, and is said to act as a purge.

SANÀTRY consists of pieces of slender stems, of the size of a goose-quill and about 6 inches long, externally greyish-brown, striated and cracked longitudinally, with scattered warts of the size of a pin's head. The thin bark, pale inside, easily splits off from the tough woody portion of the stem; the latter in transverse section is seen to be pale yellow or nearly white and porous. The taste is bitter and slightly smoky. It is used as a remedy for bronchitis and catarrh, half or a whole piece being scraped and given in water. It is used more particularly for children.

TANGÈN (*Tanghinia venenifera*, Poir.). — This celebrated seed, the ordeal poison of Madagascar, resembles an almond in the shell, except that it is rather broader in proportion, and has an open fissure on one side; the colour of the endocarp is also of a dull dirty brown. The kernel or seed is seen to be oily when pressed with the nail. (See Tangen Hakalava root.)

TSÌANKODITRA DREVO.—This drug consists of a contorted rhizome, giving rise to numerous erect branches, which are attached to the rhizome by a kind of articulation, leaving a well-marked circular cicatrix or scar where they have fallen off, the base of the stem being slightly enlarged near the joint. Both the rhizome and stems have a pale brown papery epidermis. A transverse section of the meditullium under a lens shows a single row of wedge-shaped vascular bundles surrounding the pith, and then a series of transversely oblong bundles radially arranged. The bark is as thick as the meditullium, and contains a few rather brittle vascular bundles immersed in a friable parenchyma, the cells of which, under the microscope, show in a remarkable manner sclerogenous deposits and canals leading to the centre of the cell, and form an excellent object for illustrating this structure. The taste is bitter and slightly acrid. It is said to be used mixed with "Manavo-drevo."

TSÌHITRAFÒTOTRA (*Cassytha filiformis*, L., Lauraceæ).—The name means "roots not found," and indicates its parasitic nature. The drug consists of the slender thread-like stems of the plant. It has a mucilaginous taste, but no odour. It is employed in Mauritius in the form of decoction for intestinal derangement and as a tonic for scrofulous and rachitic infants. This is another eastern remedy whose use extends to Madagascar. In India the powdered plant mixed with sesamum oil is used to strengthen the hair, and by the Brahmins for cleansing inveterate ulcers, for which purpose it is mixed with butter and ginger. The juice mixed with sugar is considered a specific in inflamed eyes ('Treas. Bot.,' p. 234). Its properties are probably due to mucilage.

TSILANKY.—This drug consists of slender woody stems, about ¼ inch in diameter, with a thin yellowish longitudinally shrivelled bark, the circle of wood being formed of pale horny tissue, divided into radial wedges by the medullary rays. The pith consists of polygonal cells with well-marked pores. The effects of this drug are said to resemble those following the bite of the tarantula.

TSILÈONDROÀHY.—This is the root of an umbelliferous plant. Externally it is marked with small transverse ridges. The transverse section shows a central white spongy meditullium surrounded by a thick bark, the liber of which consists of vascular bundles arranged in radiating lines with parenchyma tissue between them, a dark resinous circle separating this portion from the meditullium. Another similar circle occurs between the latter and the thin brown epiphlœum. The taste is pungent and the odour like that of wild angelica (*A. sylvestris*, L.), to which plant the serrate leaflets also bear some resemblance.

RAMY.—This oleoresin has the odour of elemi and is probably the produce of *Canarium Colophania*, Baker ('Fl. Mauritius,' p. 44), from which an oleo, resin is obtained in Mauritius and employed in the form of plaster as a detersive. It corresponds in appearance with the Mauritius elemi in the Hanbury collection of materia medica, both in giving no coloration with bromine water and in leaving crystals after solution in cold alcohol.

BARKS AND WOODS.

HAFOTRA FOTSY.—This occurs in the form of strips of white fibrous bark, very tough and difficult to break and consisting of liber only. It has a slightly pungent odour; when chewed it has at first no taste, but a pungent acridity is slowly developed, which lasts for several hours and recalls the taste of mezereon so strongly that it seems probable that the bark is derived from a thymelaceous plant, notwithstanding the fact that the plant received under the same name at Kew proves to be *Abutilon angustatum*, Mart.

HAVOZO.—A dull brown bark, of which the inner surface is finely striated longitudinally and the outer minutely cracked and having small warts sparingly scattered over it. A transverse section shows a thin epidermis, beneath which lie several strata of stony cells; these give to the middle of the bark a granular texture, and at right angles to them thin medullary rays give a radiate appearance to the innermost portion of the bark. The odour of the cut or bruised bark is very powerful and exactly resembles sassafras, for which it might probably form an efficient substitute in native materia medica. It probably belongs to the Lauraceæ and may possibly be the *Hernandia peltata*, or *Sassafras mauritiana*, Boj. ('Hort. Maur.' p. 273). See Baker's 'Flora Maur. and Seychelles,' p. 294.

MANDRAVASOROTRA (*Betsileo*).—This is a pale fawn-coloured or dirty-white bark, closely resembling canella bark in appearance and structure. It occurs in the form of unrolled quills about ⅔ inch in diameter. The bark varies from ⅛-¼ inch in thickness; the outer surface has the thin periderm removed and is marked with numerous small circular depressions and a few scattered warts with a smooth depressed apex. The transverse section shows under a lens a dense white parenchyma with minute circular cavities or depressions in which glistens an oleoresinous fluid (?) which apparently, when exposed to the air, yields minute crystals. The taste and odour both strongly resemble those of

Cinnamodendron corticosum, the taste being more pungent than that of canella bark.

It is used medicinally for stricture and dysuria and as a stimulant in chronic diseases.

No species of either canella or cinnamodendron is mentioned by Baker in the 'Flora of Mauritius and the Seychelles,' nor by Bouton in his 'Plantes Médicinales de Maurice.' In Madagascar the bark is used in stricture and dysuria or as a stimulant in chronic diseases.

A bark under the same name, from Betsileo province, possesses the following characters:—Bark, dull brown, externally nearly smooth, with a few faint transverse furrows, minutely striated longitudinally on its inner surface; a transverse section shows a thin dark outer line of minute cells, beneath which lies a layer of stony cells which radiate into the yellowish woody tissue of the liber in the form of pale lines distant about $\frac{1}{6}$ inch from each other. The taste and odour strongly resemble mace, with a faint resemblance to the odour of bruised carrot leaves. The layer of stony cells gives a granular fracture to the outer portion of the bark. Although probably a lauraceous bark, it evidently is the produce of a different tree from the ordinary mandrava sarotra bark; it is not identical with the Havozo bark.

NATO.—A thin bark, from which the periderm has been removed. Externally it is of a sienna brown tint and of a bright red brown on its inner surface. A transverse section is of a much paler colour. It readily splits up longitudinally into laminæ which consist of hard agglutinated fibres. The taste is astringent and slightly bitter. It is used in Madagascar to dye cloth of a red colour, but if not poisonous might form a useful astringent.

(*To be continued.*)

THE MELTING POINTS OF PETROLEUM OINTMENTS, AND A TRIP INTO THE OIL COUNTRY.*

BY SAMUEL A. D. SHEPPARD.

There has been a desire, for some time past, especially among physicians, for a petroleum ointment that shall have a higher melting point than most of those now in the market.

It has already been intimated that petroleum ointment will have a place in the coming United States Pharmacopœia, and the only question which still appeared to be open was the melting point. Statements had been made to the effect that an ointment of high melting point could not be made without the admixture of foreign substances, and, in general, the knowledge of the preparation and properties of these products was so fragmentary that it was deemed advantageous to determine, by personal observation, the following points:—

1st. Can petrolatum be made by filtration of any desired melting point between 95° F. and 120° F.?

2nd. If such be the case, is the process so practical and the supply of crude material from which it may be made so abundant that, if the article should be directed to have a melting point not exceeding 120° F., pharmacists can readily obtain it?

With this interest in view, the writer left Boston at 3 p.m., March 14, and arrived in Corry, Pennsylvania, the next day at noon.

An invitation had been received some months before from Messrs. Clark and Warren, oil refiners, of Corry, to visit the oil country, and have carried on by them any experiments on this subject, in any way desired, at their works, where all the facilities for such experiments were ready at hand or could be easily furnished at short notice.

Mr. R. C. Clark, the senior partner of the firm, met me at the depôt, and during the seven days spent in Corry and vicinity he devoted his entire time to me, himself performing nearly all the experiments, and giving his constant personal attention to all of them, sometimes till late into the night, in order that I might see the work done in the most satisfactory manner.

He gave me in every possible way all the facilities needed in the investigation, and materially assisted me, a stranger in the oil region, to obtain information on any and all points that happened to arise, and I embrace this public opportunity to thank him, especially, for his courtesy, and also to thank his partner, as well as Mr. William H. Abbotts, of Titusville; Mr. W. R. Weaver, of the Emery Oil Company, Bradford; Mr. E. B. Frew, and Mr. Babcock, both connected with the United Pipe Lines at Warren; Mr. Edward E. Kattell, of Binghamton, N. Y.; Mr. S. C. Lewis, of the Chesebrough Manufacturing Company, New York, and many other gentlemen whom I met, all of whom, without exception, cheerfully and courteously gave me information with regard to various points connected with the subject.

Wednesday afternoon was occupied in thoroughly discussing the subject with Mr. Clark and others, and in making a careful inspection of the Oil Refinery Works of Messrs Clark and Warren, in order to familiarize myself with the proposed materials, implements, and processes.

Having had previous knowledge of the nature of what is known as B. S. oil, my plan as laid out on Wednesday evening was about as follows:—

To distil and filter such B. S. oil as I could dip out of the bottom of Clark and Warren's crude oil six-thousand-barrel tank.

To go over to Warren, some 25 miles distant, to get a supply of B. S. oil from the United Pipe Lines that had been standing several years, and to distil and filter this sample. To go over to Bradford, the great centre of the present oil-producing district, and examine personally the oil wells, and talk with oil men at the wells and in Bradford, and to obtain specimens of the heavy, crude, amorphous paraffin that sticks to the sucker-rods and clogs the pipes at the wells. Lastly, to experiment in any way that seemed best on my return to Corry.

This plan was carried out nearly as stated.

The agents of the United Pipe Lines in Warren were very courteous, and readily granted the request to take a half barrel of B. S. oil from their large wooden tank, saying that there was some 4 feet of the "stuff" in the tank, and if any plan could be devised to create a demand for it, all the oil men in this section would be pleased, as it is a nuisance everywhere, and the bulk of it is increasing every year in every tank. All the persons with whom I talked told the same story. The article is a nuisance; the bane of the oil men.

This half-barrel sample was expressed to Corry, and time being limited, we went direct from Warren to Bradford. Here as much time as was necessary was occupied in going around to the oil wells, in getting samples, and in consultation with oil men as to the quantity and quality of the B. S. oil and the sucker-rod production, or "rod wax," which articles seem to me to be both simply crude amorphous paraffin, differing in density and in the admixture of lighter products.

The "rod wax," which the oil producers simply designate as "paraffin," seems to be found in both "pumping wells" and "flowing wells;" but it is not often found at a depth much lower than 250 feet below the surface.

To clear the pipes of the "pumping wells," it is necessary to draw the "sucker rod" and use a jet of steam. In the "flowing wells," when the "rod wax" has accumulated sufficiently to stop the flow, the pressure of the gas below will, after a time, force the accumulation out into the flowing tank—in other words, the well "cleans itself."

* From *New Remedies*, May, 1882.

This happens every few days or weeks or as often as may be.

The "rod wax" from the "flowing wells" is hence found at the bottoms of the "flowing tanks;" that from the "pumping wells" on or under the derrick floors, or wherever it may have been thrown to get it out of the way.

There are in the Bradford district nearly twelve thousand wells; at each of these wells there is usually one or more tanks. The Pipe Lines refuse to receive into their pipes some twenty barrels, more or less, from the bottoms of each of these tanks. This sediment in known as B. S. oil; a portion of it is water, but the greater part of it is a mixture of crude, amorphous paraffin, with a greater or less quantity of the lighter products. Its density is according to the character of the crude oil and the length of time the tank has been used.

In addition to the "producer's tank," there are scattered all through the district immense iron tanks, each holding from twenty to thirty thousand barrels of crude petroleum. From the hill overlooking Bradford, we could count nearly one hundred of these large iron tanks, and as we rode from Bradford to Carrolton, many more. In each of these tanks is a sediment of B. S. oil.

The amount of this sediment, B. S. oil, not known to be on hand is probably not less than three hundred thousand barrels. An estimate made by reliable parties of the amount of "rod wax" that could be obtained at a fair price was from five to ten thousand barrels a year, the most of which is now thrown away.

Having obtained material with which to work, experiments were commenced at the refinery in Corry. Mr. Clark had had made a small sand pump, holding about 2 gallons, with a long rope attached. This could be used to get oil from the bottoms of the tanks.

The sand pump here mentioned may be described as follows:—It was an upright galvanized iron cylinder some 6 or 8 inches in diameter and 20 inches long, open at the top, its bottom closed by a valve so arranged that as the cylinder sank down into the oil the valve remained open, and the cylinder sank through the various strata of oil as it would were it bottomless; but immediately on an attempt being made to draw the cylinder upward, the valve closed, and the cylinder could be drawn up to the surface, filled with oil from any stratum desired. Small iron legs, 3 inches long, prevented the lower edge of the cylinder from reaching the bottom of the tank, the object being to thus prevent the taking up of water, a stratum of which is at the bottom of each tank.

He had also arranged a small still of about 15 gallons' capacity, a cheese-box still, some 20 inches in diameter and about 15 inches high, with iron piping $\frac{7}{8}$ of an inch in diameter, to serve as inlet and outlet tubes, the vapour of the lighter products being carried through the wall to the outside of the building through a similar iron tubing, and thence through some 30 or more feet of iron tubing as a condenser. The temperature of the atmosphere being somewhat below freezing, this made a pretty fair condenser, cold water being poured on occasionally.

A small pipe was arranged to conduct a jet of steam to the bottom of the inside of the still.

The still was incased in brickwork; the heat applied was that obtained from an ordinary wood fire, great care being used not to allow the heat to get too strong.

With the sand pump some 7 gallons of the sediment were drawn from the bottom of Clark and Warren's crude-oil tank with which to charge the still. This oil was not a good specimen of B. S. oil, because it had been standing only about one month, and was not so thick as could have been desired.

Very shortly after the heat was applied to the still, benzin commenced to run. As the distillate came over, its gravity was tested every few minutes. The first run stood at about 70° Baumé; it very soon came down to 65° and to 60° Baumé.

I was told that I could not judge fairly of the quantity and gravity of the light products, owing to the smallness of the quantity and the character of the stock used; but I was not so much interested in the distillate as in the residuum.

When the distillate stood at about 50° B., a small jet of steam was turned on, the force being afterwards increased somewhat. The use of steam serves to help drive off the lighter products more completely and at a lower temperature.

At 40° B., wax was struck, and the distillation was stopped by removing the heat from the still. To "strike wax" is a term used to denote that point in the process of distillation at which the distillate shows the presence of paraffin wax, by the latter congealing on the cool edges of the condensing tubes or otherwise.

The still was allowed to stand undisturbed until it was presumed that its contents were sufficiently cooled not to take fire on exposure to the air, yet not long enough to get cold. Mr. Clark stated that there would have been great danger of fire, had the residuum been drawn off at once, when the heat was removed, as the temperature was probably from 500° to 600° F., or higher. The residuum was then drawn off slowly into an open pan. Its temperature was 320° F.; quantity about $2\frac{1}{2}$ gallons.

An ordinary heavy tin cone-bottom percolator, with a stop-cock, had been arranged in a box closed on three sides, one of the three sides being arranged as a door.

The percolator was 11 inches in diameter, and its perpendicular sides were 22 inches in height.

A perforated metal diaphragm, 3 inches in diameter, was placed over the outlet tube; this diaphragm was covered with a piece of unbleached cotton, over which was placed some ordinary cotton batting. Thus prepared, the percolator was ready to receive the animal charcoal and the residuum.

Coarse animal charcoal had been heated to a red-heat for about one half-hour to free it from bone odour. This charcoal was now only quite warm, so cool that it could be easily handled with the bare hands. The warm charcoal was packed firmly in the percolator to the depth of 6 inches, and the hot residuum, having stood now in the air about a half-hour, was poured on. The open side of the box, in which the percolator was arranged, was so placed as to receive a current of hot air, and thus the temperature of the air in the box was kept constantly at from 180° to 200° F.

The first run from the percolator was quite light-coloured. It soon commenced to grow darker in colour, and by the time a half-gallon had passed, it was evident that a second filtration would be necessary.

The product was very sweet and free from odour, but was not so heavy as desired (having a melting point of 100° F.), and it was decided not to spend any more time on it, but to get another lot of 10 gallons of oil from the bottom of the tank, and distil and proceed with the distillation until the distillate should have a gravity of but 37° B.

This was at once done; the temperature of the residuum when running from the still was 380° F., and, when cooled, it had a melting point of 102° F., and the melting point of the filtered product was the same.

Experiments were made to test the melting points at various stages in the process of filtration, but, in the quantity that we were handling, there was comparatively little difference, though the general rule of oil men, that "repeated filtrations lessen the cold test," proved true. In other words, the more filtering, the higher the melting point.

Two lots of 10 gallons each of the B. S. oil, from Warren, were distilled and filtered. The gravity of this oil was 36° Baumé.

The distillation of the first lot was carried on until the distillate had a gravity of 40° B. The temperature of the residuum, when running from the still, was 360° F., and the filtered product had a melting point of 100° F.

The distillation of the second lot was carried on until

the distillate had a gravity of 34° B. The temperature of the residuum, when running from the still was 380° F., and the melting point of the filtered product was 110° F.

One lot of 3 gallons of crude paraffin that causes the clogging of the wells, "rod wax," was distilled and filtered.

The residuum from it was about 80 per cent. of the amount used. The temperature, when running from the still, was 400° F., and the melting point of the filtered product was 138° F.

A lot, consisting of a mixture of 2 gallons of the sediment from Clark and Warren's tank and 1 gallon of rod wax was distilled and filtered. The temperature of the residuum, when running from the still, was 405° F., and the melting point of the finished product was 130° F.

One lot, consisting of a mixture of 2 gallons of the sediment from Clark and Warren's tank and ½ pound of commercial paraffin wax was distilled and filtered. The temperature of the residuum, when running from the still, was 380° F., and the melting point of the filtered product was 110° F.

The object of this experiment was to have a sample known to contain crystalline paraffin wax, and, by future examination, to judge of the homogeneous character of a preparation when the admixture was made previous to distillation. There is so much cracking or splitting up in these paraffins that it is not always easy to say what may occur till an experiment has been made.

A quantity of *very dirty* rod wax had been brought from one of the wells in Bradford. It was the worst specimen that we could find. This was placed in an open pan in a very warm place, allowed to stand thirty-six hours, strained through cotton, and filtered through animal charcoal. The melting point of the finished product was 140° F.; colour and odour very good, and, by repeated filtrations, it was made nearly white.

An experiment was made by filtering a small lot of very nice inodorous petrolatum through ordinary animal charcoal. The filtrate was quite offensive in odour, especially when warmed.

A similar experiment was tried with ground, unburned bones, and gave a product that, when hot, was simply disgusting in its odour, as, of course, I expected it would be.

Complaints have frequently been made by dermatologists that the petroleum ointments of the markets are sometimes irritant in their action. This can probably be explained by the fact that sufficient care is not always used to have the animal charcoal, which is used for filters, properly purified. It can be purified by heating it to 500° to 700° F., for, say, half an hour, the heating being done a comparatively short time before using the charcoal. If the charcoal be not freed from impurities, the petroleum product, when filtering through it, will be likely to absorb the condensed noxious gases, and thus may become, not only an offensive, but an irritant instead of an emollient application.

A specimen of what is known as "tar" was obtained from the oil works of Messrs. Downer and Co., at Corry. It is the residuum left in the petroleum still when the distillation had been carried to 23° to 18° Baumé. From this "tar," by destructive distillation, paraffin oils and wax are obtained, coke being left in the still. By congelation and pressure, the paraffin wax is separated from the oils. No experiments were made with this "tar," as it did not seem to have a bearing on the subject in hand.

The writer has now on hand specimens of all the crude materials used in the foregoing experiments, and also of the products obtained therefrom.

Of one fact the writer was thoroughly convinced, as he watched the slow, tedious processes of filtration through animal charcoal. It was that, in the future, pharmacists will probably use, for some purposes, a petroleum ointment that is not so thoroughly decolorized as the nice articles now found in our markets.

The process of filtration is the expensive part of the manufacture of this article. A general estimate that would be fair, would probably be that from 300 parts of residuum, but 100 parts of the nice light straw-coloured goods can be obtained; it being necessary to use so much charcoal that the 200 parts are absorbed by it, for the charcoal absorbs about one-half its weight of the residuum. If an article not quite so nearly decolorized could be used, it could be furnished by the manufacturers at a much lower price than they are now obliged to ask for it, and the question now arises, Is the very light-coloured product really any better than one slightly coloured, yet equally free from odour?

The writer does not feel competent to answer, but he thinks that it is a question worthy of consideration, for it seems probable that if a somewhat darker-coloured product, equally free from odour, should be found equally good as a base for ointments, it could be furnished at a low price, say 8 to 10 cents a pound less than is now paid for good lard. The residuum can be deodorized without the use of animal charcoal, and the opinion was freely expressed by intelligent persons, familiar with the subject, that the residuum deodorized, not filtered, is a good dressing for wounds.

Leaving Corry at noon, March 22, I went to Binghamton, N. Y., and the next morning had a very pleasant and instructive visit of a couple of hours at the Binghamton oil refinery. Mr. Edward E. Kattell, one of the proprietors, courteously showed me the whole process of the manufacture of petrolina, the petroleum ointment put on the market by them. They do not use the residuum from the still in making petrolina, preferring to make it by deodorizing a mixture of "rod wax" and some lighter product in proper proportions, and filtering the deodorized mixture through animal charcoal. The lighter product used is either crude petroleum oil or some one of the paraffin series of oils that may be somewhat unsalable.

Mr. Kattell thinks that the supply of rod wax is limited, but that should it become scarce, they would make the goods from heavy B. S. oil, by distilling it and then deodorizing and filtering the residuum, whereby they can get an ointment that shall have a melting point of 115° F.

Mr. Kattell does not think that an ointment of a higher melting point than 115° F. can be made without the use of rod wax, but a comparatively small quantity of rod wax would be sufficient to stiffen the 115° F. goods made from "tank bottoms" B. S. oil, so that they would have a melting point of 120° to 125° F., and there is no probability that the supply of rod wax will entirely cease.

Passing through New York on my way home, I called at the office of the Chesebrough Manufacturing Company to gather information on the subject of the melting points of petroleum ointments. Mr. Chesebrough was not in, but I had the pleasure of a very pleasant interview with Mr. S. C. Lewis, the vice-president of the company. He discussed the matter at some length, and gave in detail the position of the company in regard to the melting point to be adopted in the coming pharmacopœia. It was, that, from information gathered by them from many reliable sources, the consumers of the article will be best satisfied if they can have two preparations, the one having a melting point of 100° F., and the other 115° F. He also stated that the company is ready to furnish an article that should have any melting point desired below 125° F., and at the same time be entirely homogeneous, with no admixture of paraffin wax. He courteously invited me to visit their manufactory at some future time, though he could not of course reveal the trade secrets of the company. He stated that his opinion, as a manufacturer, was that if a melting point higher than 115° F. should be adopted, it would probably cause the market to be flooded with preparations that would not be homogeneous, but would have an undesirable granular character, as he thought

manufacturers would resort to other ingredients as admixtures, that would deteriorate the quality.

The writer would have liked to have visited Philadelphia in order to see the process for the manufacture of cosmoline, but was not able to do so.

The conclusions arrived at may be summed up as follows:—

Although the term paraffin may be and is properly applied chemically to any one of the long series of hydrocarbons, commencing with marsh gas and running up through the benzins, the illuminating oils, and the lubricating oils to paraffin wax, the usage of trade really confines the term paraffin to those of the series that are solid or semi-solid at ordinary temperature. It is in the latter sense that the term will be used in the following remarks.

Petroleum, as it comes from the earth, may be said to be capable of division into three parts by distillation, viz., into what may be practically termed two series of oils: the benzin oils and the paraffin oils and paraffin wax.

The division between the two series of oils may be said to occur in the process of distillation when very carefully conducted, when the gravity of the distillate has been reduced to about 42° to 41° Baumé.

The benzin oils are colourless or white oils, and have a peculiar benzin odour. They are also said to have a definite boiling point.

The paraffin oils are yellow or straw-coloured oils, and have a greasy or waxy odour.

The oils in the paraffin series are very easily split up into other and lighter products of the same series by the skilful application of heat.

The article desired as a base for ointments by physicians and pharmacists is really amorphous paraffin mixed with a certain amount of one or more of the above-mentioned series of paraffin oils, but entirely free from admixture with any of the benzin series or the *crystalline* paraffin wax.

The benzin oils, if present, give an objectionable odour, and the crystalline paraffin wax, if present, will, in time, especially if the article be exposed to a low temperature, render it granular and cause it to separate, thus losing that homogeneous character so desirable in an ointment.

The question now is how to obtain this desired article. From all crude petroleum oils paraffin settles to a greater or less degree, so that if a tank containing two hundred and fifty barrels has been used at a well for three or four years, it may be expected to contain at the bottom of the tank a deposit, ranging in depth from 4 to 8 inches, of a mixture containing a large proportion of paraffin. This paraffin is always in an amorphous condition, the crystalline character being found only in those products that have been subjected to the process of distillation.

Observations show that this amorphous paraffin and the harder varieties that clog the pipes may be easily obtained in quantities sufficient for all the demands of medicine and pharmacy. We have, therefore, ready formed for us in Nature's laboratory the article we desire, but it is contaminated by oils of the benzin series, with odorous and colouring matter; the oils are gotten rid of by careful distillation, and the other by filtration through animal charcoal.

The harder variety, "rod wax," is the article that may be used to advantage to increase the melting point of petroleum ointment. Its melting point being about 140° F., and it being an amorphous and not a crystalline paraffin, it can be mixed, when purified, with goods of a lower melting point, to make a homogeneous article, as is shown by samples of such mixture that have stood more than a year. It is better, however, that the admixture be made previous to distillation. It is necessary that the animal charcoal, used as a filtering medium, be freed *by recent burning* from condensed noxious gases or other impurities.

To obtain petroleum ointment of a desired melting point it is necessary to *start* right, that is, to select such crude material as will, by distillation or purification in some way, give a residuum having the wished-for melting point. It is the opinion of the writer that to obtain an article having a melting point anywhere from 100° to 120° F., such crude material can be obtained easily, abundantly, and at a fair price, and that if a demand should be created for such an article, the demand will be quickly supplied.

The above conclusions are given as the opinions of the writer, derived from careful thought and experiment in the past, and now confirmed by observations and experiments under circumstances where it would seem that just conclusions might be formed.

While the writer does not presume that he has developed any hitherto unknown facts, and certainly will not object to any just criticisms, he hopes to add a little interest to the study of this subject, and to stimulate research in a direction to which pharmacists in the past have given too little thought and attention.

STUDIES ON THE ALKALOIDS.

BY DR. W. KOENIGS.*

ANNOTATED BY M. DE BECHI.

(*Continued from Vol. XII., page* 745.)

4. *Relations between Alkaloids and the Pyridic Bases.*

Recent works upon the acids obtained by oxidation of different alkaloids and belonging to the pyridic series, seem of great importance in respect to the constitution of these interesting bodies.

In 1867, Huber,† by treating nicotine with bichromate of potash and sulphuric acid, obtained an amide acid, $C_6H_5NO_2$, which he found subsequently‡ to be pyridino-carbonic acid, $C_5H_4N.CO_2H$, and which distilled with lime gave an oily base, C_5H_5N; soluble in water. Weidel§ obtained the same acid by oxidation of nicotine with fuming nitric acid; he found that it gave pyridine by distillation with quicklime, but he attributed to it the formula of $C_{10}H_5N_2O_3$, instead of $C_6H_5NO_2$. Luiblin‖ showed the formation of a pyridino-carbonic acid by the oxidation of nicotine with potassium permanganate. By treating quinine, cinchonine, quinidine, and cinchonidine with the permanganate, Hoogewerff and van Dorp,¶ and Ramsey and Dobbie** obtained pyridino-tricarbonic acid. An isomeric acid has been obtained by Weidel†† by treating berberine with concentrated nitric acid.

Piperidine, $C_5H_{11}N$, yields pyridine, C_5H_5N, by oxidation (Kœnigs).‡‡ Lastly, Gerichten§§ obtained a pyridino-carbonic acid by means of an alkaloid of opium, narcotine. Monobasic apophyllic acid, $C_8H_7N_4$, obtained by Woehler and Anderson by oxidation of cotarnine, $C_{12}H_{13}NO_3$, is decomposed, when heated, into an oil having an alkaline reaction and chinoline odour (Woehler).‖‖ When heated to 240°–250° C. with concentrated hydrochloric acid, chloride of methyl separates, and a bicarbonated acid of pyridine is formed, identical with the cinchomeronic acid

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* 'Studien über die Alkaloide.' By Dr. W. Koenigs. Munich: F. Straub, 1880. With annotations and additions referring to recent researches by M. de Bechi. Translated from the *Moniteur Scientifique*. The additions are included within brackets.

† *Annalen*, vol. cxli., p. 271.

‡ *Berichte*, 1870, p. 840.

§ *Annalen*, vol. clxv., p. 328.

‖ *Berichte*, 1877, p. 2136; *Annalen*, vol. cxcvi., p. 129.

¶ *Annalen*, vol. cciv., p. 84.

** *Journ. Chem. Soc.*, London, vol. xxxiii.; *Transactions*, 1879, p. 189.

†† *Berichte*, 1879, p. 415.

‡‡ *Idem*, 1879, p. 2341.

§§ *Idem*, 1880, p. 1636.

‖‖ *Annalen*, vol. l., p. 24.

obtained by Weidel* by oxidizing the cinchona bases with nitric acid. Gerichten, therefore, considers apophyllic acid to be a methylic acid ether of cinchomeronic acid:—

$$C_5H_3N \begin{cases} CO_2H \\ CO_2.CH_3 \end{cases}$$

and he admits that cotarnine includes the group ($CO_2.CH_3$). Up to this time then, pyridine or its carboxylic derivatives have been obtained from nicotine, the cinchona bases, berberine, narcotine and piperine.

[Gerichten† has studied cotarnine and its derivatives and arrived at the following results. Apophyllenic acid, already obtained by Wöhler, is prepared by oxidizing cotarnine by means of nitric acid. The yield is bad, only 10 to 15 per cent. of the cotarnine employed. It crystallizes in rhomboctahedra, is rather soluble in hot water, slightly soluble in cold water, and insoluble in alcohol and ether. It melts at 241° to 242° C., with evolution of carbonic acid. It is monobasic. Heated with hydrochloric acid to 240° to 250° C., it loses methyl, giving cinchomeronic or pyridinocarbonic acid.

$$\underset{\text{Apophyllenic acid.}}{C_5H_3N \begin{cases} COOH \\ COOCH_3 \end{cases}} + HCl = CH_3Cl + \underset{\text{Cinchomeronic acid.}}{C_5H_3N \begin{cases} COOH \\ COOH \end{cases}}$$

Cinchomeronic acid becomes yellow at 250° C., and melts at 266° to 268° C. Its most characteristic property is its behaviour with acetate of copper, which does not give a precipitate in the cold. Upon heating the solution it becomes turbid, and clears again upon cooling. Prolonged boiling, however, produces a permanent azure blue crystalline precipitate.]

It is customary to consider the alkaloids to be a large class of bases more or less related, and also to distinguish them by placing them in groups formed of the bases met with in the same plants, and which present common physiological and chemical properties.

The same thing is done in respect to many other (non-nitrogenated) bodies of the vegetable kingdom, which can be changed from one into another (for example, many carbohydrates into dextrine, the camphors and terpenes into cymol, etc.). The same relations have been found between alkaloids derived from the same plants, as, between caffeine and theobromine; morphine and codeine; conhydrine and coniine; hydrocotarnine and cotarnine; harmaline and harmine; strychnine and brucine; cinchonine and quinine; cinchonidine and quinidine; these last alkaloids have all given the same pyridino-tricarbonic acid by oxidation. It can therefore be admitted that the other bases of opium and the alkaloids in general would give pyridic derivatives by proper treatment. A proof that atropine and coniine will behave similarly seems to be supplied by a recent work of Harnack and Meyer.‡ These authors have found in the leaves of jaborandi, besides pilocarpine, $C_{11}H_{16}N_2O_2$, analogous to nicotine in its physiological action, a new alkaloid, jaborine, which acts like atropine; they have besides verified the researches of Poehl,§ who has found that by distilling pilocarpine with potash, a base volatile at 160° C. is obtained, very probably identical with coniine, and which perhaps accrues from the jaborine contained in the crude product, besides pyridic bases (which are also found in the mother-waters of the preparation of pilocarpine).

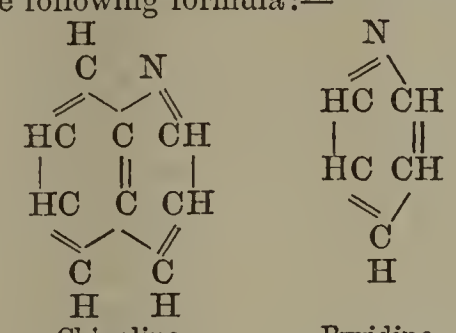
From all this, it seems that pyridine may be the nucleus around which all the alkaloids ought to be grouped, like the aromatic bodies around benzine. Some vegetable bases are known, it is true, which are not derived from pyridine, as, for example, betaine, sinapine and muscarine, which have a close relation to the oxyethylenic bases, and caffeine and theobromine, which, from the great quantity of nitrogen they possess, approach nearer to the animal than the vegetable bases. The first are not generally ranked in the class of alkaloids, which includes especially vegetable bases of which the constitution is too little known to permit them to be reckoned amongst the classified bodies. If it were desired to reckon only this kind of bodies amongst the alkaloids, the best definition would be the following:—

Under the name alkaloid is understood organic vegetable bases which are pyridic derivatives.

The pyridic nucleus would then be analogous to the benzoic nucleus, and the fruitful theory of Kekulé could be applied, probably with all its consequences. Twelve years ago, Koerner put forward the hypothesis that pyridine might be a benzine, in which a CH group is replaced by N, and that chinoline has a similar resemblance to naphthaline. This supposition has been shown to be true by the transformation of hydrocarbostyril or orthoamidophenylpropionic acid:—

$$C_6H_4 \begin{cases} NH_2 & (1) \\ CH_2.CH_2CO_2.H & (2) \end{cases}$$

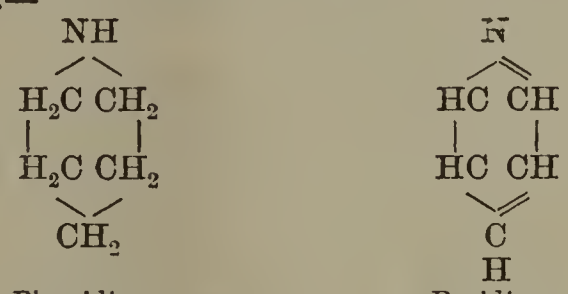
into chinoline, and this by oxidation can be converted into pyridine-dicarbonic acid. These relations are expressed by the following formula:—



Chinoline. Pyridine.

I have been induced to study the oxidation of piperidine, nicotine and coniine and to prepare some non-oxygenated bases by means of cinchonine and quinine, and I will here state the ideas which I have conceived concerning the relations between alkaloids and pyridic bases.

Piperidine, a secondary base, can be converted by oxidation into pyridine, a tertiary base, and it seems to me that the best way to explain the great stability of piperidine in the presence of hydrochloric acid at a high temperature is to admit that piperidine is a hydrogenated addition product of pyridine, having consequently for its formula:—



Piperidine. Pyridine.

According to Cahours and Etard,* nicotine, $C_{10}H_{14}N_2$, treated with potassium ferrocyanide, gives a base containing 4H less, which they named isodipyridine,

$$C_{10}H_{10}N_2.$$

By treating tropine, $C_8H_{15}NO$, one of the decomposition products of atropine, with hydrochloric and acetic acids to 180° C., Ladenburg† obtained a base with a coniine odour, tropidine, $C_8H_{13}N$, which is formed with elimination of water. This reaction is analogous to that produced by Wertheim, who obtained coniine with conhydrine and phosphoric anhydride:—

$$\underset{\text{Conhydrine.}}{C_8H_{17}NO} - H_2O = \underset{\text{Coniine.}}{C_8H_{15}N}$$

It seems to me probable that tropidine is a collidine, two atoms richer in hydrogen. The composition of these bases shows the great analogies which exist between them: collidine, $C_8H_{11}N$; tropidine, $C_8H_{12}N$; coniine, $C_8H_{15}N$; the first two are secondary bases, and the third a tertiary base. Now, according to Ador and

* *Annalen*, vol. clxxiii., p. 76.
† *Berichte*, 1880, p. 1635; 1881, p. 310.
‡ *Annalen*, vol. cciv., p. 67.
§ *Berichte*, 1879, p. 2185.

* *Comptes Rendus*, vol. xc., p. 275.
† *Berichte*, 1879, p. 941.

Beayer,* collidine is obtained by distillation of ammonia-aldehyde and, according to Wischnegradsky,† it ought to be considered as trimethylpyridine. The researches of Harnack and Meyer, upon the relations existing between these three bases, increase the probabilities.

It can be therefore admitted that the non-oxygenated alkaloids, or the bases obtained by their decomposition, are to the pyridic bases what the terpenes are to cymene. According to this alkaloids would contain reduced pyridic nuclei, which seems demonstrated by the fact that in plants bases are often found which only differ among themselves by a small number of atoms of hydrogen, as, for example, harmaline and harmine, hydrocotarnine and cotarnine, cinchotine and cinchonine. It might also be admitted that the bases richer in hydrogen have either been formed by a more advanced reduction, or from alkaloids produced originally or their mother-substances.

It is known that the camphors are closely allied to the terpenes and cymene, and I think that, in many cases, some similar relations exist between oxygenated and non-oxygenated alkaloids, as well as between the pyridic and chinolic bases and their polymers. For example, the conversion of conhydrine into coniine, and tropine into tropidine, is analogous to the formation of terpenes with borneol and phosphoric anhydride. By treating cinchonine with oxychloride and pentachloride of phosphorus, I have obtained a chloride, $C_{19}H_{21}N_2Cl$, which, treated with alcoholic potash furnishes a base, $C_{19}H_{20}N_2$, the relations of which with chinoline have not been yet settled. The formation of these products is analogous to that of borneol camphene, $C_{10}H_{16}$, and of chloride of borneol, $C_{10}H_{17}Cl$, by means of borneol, $C_{10}H_{18}O$.

The manner in which the oxygen is united in the oxygenated alkaloids is not known. Morphine, which is a tertiary base, contains, according to Polstorff and Broockmann,‡ three hydroxyls, for it gives, with chloride of benzoyl, a tribenzoylic compound. According to Wright and Rennie,§ only dibenzoylic-morphine can be obtained; in codeine, one of the groups OH of morphine is replaced by methyoxyl, OCH_3, and the very great oxidizability of morphine in an alkaline solution recalls certain properties of pyrogallol; in an ammoniacal solution, for example, morphine is oxidized by atmospheric oxygen into the condition of oxydimorphine, $C_{34}H_{36}N_2O_6$ (Polstorff and Broockmann).

Cotarnine, $C_{12}H_{13}NO_3$, very probably contains a CO_2CH_3 group, and the third atom of oxygen in the condition of methyoxyl. From these examples, it will be seen that oxygen is not always found in the alkaloids as in the camphors, in the condition of carboxyl (CO)″, or hydroxyl (OH)′ although this is probably generally the case. Camphors are derived from cymene, and alkaloids from pyridic bases and their polymers, by addition of hydrogen or water. At present we have no idea of the mother-substances by means of which those two great categories of bodies (camphors and alkaloids), so widely distributed in the vegetable kingdom, are formed, but it seems that an annular skeleton of atoms must be necessary for the formation of these bodies; in the case of alkaloids, it is a pyridic nucleus; for camphors a reduced benzene ring. Several facts, however, which seem to contradict this opinion, cannot be passed over in silence, such as that pyridic derivatives have not been obtained by the oxidation of certain alkaloids, such as morphine or coniine. This finds an analogy in certain products of oxidation of oil of turpentine, terebic and terpenylic acids, which do not contain the benzene nucleus. Generally, the difficulties of converting an alkaloid, or its basic products of decomposition, into reduced pyridic derivatives, augments with the number of free hydroxyls and atoms of added hydrogen.

* *Annalen*, vol. clv., p. 294.
† *Berichte*, 1879, p. 1501.
‡ *Berichte*, 1880, p. 96.
§ *Idem*, 1880, p. 1996.

I readily admit that these general opinions concerning the constitution of alkaloids require to be rectified by numerous researches, which, I hope, will be of great utility to medicine and pharmacy, especially if the difficulties which have hitherto prevented the accomplishment of the synthesis of these interesting bodies can be surmounted, a synthesis which can only be accomplished when our knowledge of the formation of these products shall be more advanced. The examples of salicylic acid, and homatropine illustrate the utility of researches which, generally undertaken for theoretic ends, have led to some very important industrial applications.

Wallach* has recently obtained some interesting bases by the action of pentachloride of phosphorus upon substituted acid amides. These bases are non-oxygenated tertiary diamines, which present, from a physiological and chemical point of view, great analogies to the natural alkaloids.

(*To be continued.*)

THE BARK OF FRAXINUS AMERICANA.†

The white or American ash grows from Nova Scotia and New Brunswick to the western shores of Lake Superior, southward to Florida and Louisiana, and westward to Eastern Nebraska and Kansas. It attains a height of 60 to 80 feet, the trunk being from 4 to 6 feet in diameter. The wood is light, tough, very strong and elastic, and is extensively used in the manufacture of agricultural implements, carriages, oars, cabinet-work, etc. The bark is collected from the trunk and root, the latter being preferred. As seen in commerce it is usually in pieces varying from 3 to 6 millimetres ($\frac{1}{8}$ to $\frac{1}{4}$ inch) in thickness, from 25 to 75 millimetres (1 to 3 inches) in width, and sometimes 15 centimetres (6 inches) in length. The suberous tissue being generally removed from the old bark, this is externally whitish or greyish-yellow, sometimes reddish or brown-red, frequently with irregular longitudinal ridges and warts from adhering cork; internally it is yellow and smooth. Its transverse fracture is very fibrous, its odour is slightly aromatic, and its taste bitter and slightly acrid.

John M. Bradford, Ph.G., determined the amount of extract obtainable by different menstrua. The experiments appear to have been made with air-dry bark, and the amount of moisture left in the extracts does not appear to have been ascertained. In each case 1000 grains of the powdered bark were exhausted by percolation, and the resulting liquor evaporated in a water-bath; the yield was as follows:—

1. Menstruum: strong alcohol, yield: 22·4 per cent. extract.
2. Menstruum: alcohol 4 parts, water 1 part, yield: 26·2 per cent. extract.
3. Menstruum: alcohol 4 parts, water 2 parts, yield: 28·2 per cent. extract.
4. Menstruum: alcohol 4 parts, water 3 parts, yield: 29·0 per cent. extract.
5. Menstruum: alcohol 4 parts, water 4 parts, yield: 31·6 per cent. extract.
6. Menstruum: alcohol 3 parts, water 4 parts, yield: 31·6 per cent. extract.
7. Menstruum: alcohol 2 parts, water 4 parts, yield: 31·6 per cent. extract.
8. Menstruum: alcohol 1 part, water 4 parts, yield: 31·8 per cent. extract.
9. Menstruum: water (percolate turbid), yield: 28·8 per cent. extract.

All the extracts had a bitter taste, and the bitter principle is therefore soluble both in alcohol and water. The alcoholic extracts were soluble in water, leaving no per-

* *Annalen*, vol. clxxxiv., p. 1.
† Abstract from two Theses presented to Philadelphia College of Pharmacy. Reprinted from *American Journal of Pharmacy*, June, 1882.

ceptible residue, but yielding a slightly cloudy solution from suspended resin.

The bark exhausted with ether, and the ether evaporated spontaneously, yielded a fatty matter lighter than water, and having a green tint, which changed to a yellow-red colour on heating to the boiling point.

On distilling the bark with water a minute quantity of volatile oil and a white substance was obtained, the latter subsiding in the distillate. The bark was also found to contain starch, gum, tannin and a bitter principle.

Howard M. Edwards, Ph.G., examined a sediment from the wine of white ash bark, and found in it an acid and a neutral resin, sugar, gum and other matters.

In analysing the bark, the powder was exhausted with a weak alcohol of 15 per cent., the liquid was evaporated to a syrupy consistence and mixed with alcohol, which produced a light-red precipitate of gummy matter having a sweetish and slightly pungent taste, the pungency being probably due to a little resin. The filtrate was concentrated and precipitated by water, a pungent resin, having an acid reaction, separating, while the filtrate gave decided indications of the presence of an alkaloid both by Mayer's test and by solution of iodine. This last filtrate was precipitated by subacetate of lead, a thick yellow precipitate being obtained, and the filtrate, after having been freed from lead by sulphuretted hydrogen, yielded precipitates with tannin, picric acid and ammonia. After adding ammonia, the liquid was shaken with ether, which dissolved the precipitate, leaving the ammoniacal solution slightly red. The ethereal liquid, on being evaporated spontaneously, left no crystals, the alkaloid being contaminated with other substances. The amount of alkaloid being so small, I was not able to carry the investigation further. The alkaloid showed an alkaline reaction with litmus and had a bitter taste; it is doubtless the active principle of the drug.

A decoction of the bark was found to contain sugar and starch; but neither tannin nor gallic acid was found; the reactions, which were at first thought to be those of gallic acid, were afterwards shown to be due to colouring matter and acid resin. Ferric chloride gave a bluish-black colour; but gelatin and tartar emetic gave no precipitates. (J. M. Bradford obtained a precipitate with gelatin.)

The decoction was precipitated by acetate of lead, the precipitate washed, suspended in water, decomposed by H_2S, filtered, heated and then tested: ferric chloride gave a blue colour; gelatin solution, tartar emetic, lime solution and ferrous salts gave no reaction; but sodic hydrate gave a brown colour.

The volatile oil, obtained by distillation with water, was aromatic and had a bland taste.

The following pharmaceutical preparations were made:—

The *tincture*, made with 20 per cent. alcohol, four troy ounces to the pint, was bright red, slightly aromatic, of a bitter taste, and exposed to the cold became slightly turbid.

The *fluid extract*, made with a menstruum composed of water 11 parts, glycerin 1 part and alcohol 4 parts, was deep red or blackish red, very bitter and slightly pungent.

The *extract* was made with 20 per cent. alcohol; yield, 7 parts from 24 parts of the drug; it is of a blackish-red colour and has an extremely bitter and burning taste.

THE ACTIVE PRINCIPLE OF ADONIS VERNALIS.*

BY DR. V. CERVELLO.

The use of the Ranunculaceous plant, *Adonis vernalis*, L., in some forms of heart disease has led to some physiological experiments from which it would appear that it is capable of exercising an action similar to that of digitalis, with the advantage that it is not cumulative, its administration during a considerable time being without danger. But hitherto nothing definite has been known with respect to the constituent or constituents of the plant to which the action is due. The author, as the result of a chemical investigation of the plant, states that it contains only one active constituent, a glucoside, which he has named "adonidin."

In the preparation of adonidin the plant is cut into small pieces, which are macerated during two day in dilute (50 per cent.) alcohol; the liquid is filtered, the filtrate treated with basic acetate of lead, separated from the resulting precipitate by decantation and evaporated on a water-bath to a syrupy consistence. The residue, which is very bitter and has an acid reaction, is carefully made slightly alkaline by the addition of ammonia solution, and then heated with a strong solution of tannic acid, which is added as long as any precipitate is formed. The precipitate is a compound of the active constituent and tannic acid, difficultly soluble in water. This is collected on a filter, washed with a small quantity of water and dried between paper. To decompose this tannic acid compound zinc oxide and some alcohol are added and the whole is heated in a water-bath until the liquid is evaporated, when the mass is treated with strong alcohol, filtered and the residue on the filter washed with much alcohol. The filtrate is yellow and contains the adonidin not quite pure. To purify it the solution is evaporated by a gentle heat to a small volume and ether added, when inactive coloured matter is precipitated together with a trace of adonidin. Upon evaporation of the mixture of alcohol and ether by a moderate heat a residue is obtained, which represents pure adonidin and is finished by drying in a vacuum over sulphuric acid.

The quantity of adonidin obtained in this way, from two kilograms of *Adonis vernalis* was small; this the author does not consider due to any defect in the method of preparation, but to the fact that the compound, which is extremely energetic, is contained in the plant in relatively small proportion.

Adonidin is non-nitrogenous, colourless, odourless, amorphous, and extremely bitter. It is soluble in alcohol, but only slightly so in ether and in water. It is precipitated by tannic acid, the precipitate redissolving in much water. It is insoluble in dilute hydrochloric acid in the cold, but on being heated with the dilute acid it splits up into sugar and a substance insoluble in ether.

The author is not in a position to say whether the decomposition product has any action upon the organism, analogous to the case of digitaliretin, obtained under similar conditions from digitalin by Schmiedeberg.

With respect to the physiological action of adonidin the author sums up the results of his experiments by stating that it may be described as identical with that of digitalin, with the single exception that it is far more powerful. He also confirms the statement that it is not cumulative.

* Abstract of a paper in the *Archiv für Experimentelle Pathologie und Pharmakologie*, xv., 235.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Concluded from page* 90.)

SYRUPUS IPECACUANHÆ STIBIATUS (*Antimonial Wine of Ipecac*).

Tartrate of antimony and potassium . .	3
Tincture of ipecac (1 : 10)	100
Syrup	2000
Water	q.s.

Dissolve the tartrate of antimony and potassium in a little water; add the solution to the tincture and syrup

* From *New Remedies*, April, 1882.

contained in an evaporating dish, and evaporate, on a water-bath, until the product weighs 2000 parts.

SYRUPUS JUGLANDIS COMPOSITUS (*Compound Syrup of Butternut Leaves*).

[Vanier's Antirhachitic Syrup.]

Extract of butternut leaves	4
Extract of brown (grey) cinchona	2
Alcohol	4
Port wine	6
Syrup	180
Iodide of potassium	1
Oil-sugar of anise (1 part of oil and 50 parts of sugar)	3

Mix the extracts with the alcohol, port wine and 10 parts of syrup. Dissolve the iodide of potassium and the oil-sugar of anise in 170 parts of syrup and mix the two liquids.

SYRUPUS JUGLANDIS COMPOSITUS CUM OLEO MORRHUÆ (*Compound Syrup of Butternut Leaves with Cod-Liver Oil*).

Compound syrup of butternut leaves	19
Cod liver oil	1

Mix them.

SYRUPUS LACTUCARII (*Syrup of Lactucarium*).

Lactucarium	1
Sugar	q.s.
Water	q.s.

Rub the lactucarium with a little sugar, and 180 parts of water; then heat to boiling and filter the liquid.

In 10 parts of the liquid dissolve 19 parts of sugar.

SYRUPUS LENITIVUS (*Lenitive Syrup*).

Hydrochlorate of morphine	1
Cherry-laurel water	100
Syrup	3839
Tincture of cochineal (1 : 8)	60
	4000

Dissolve the hydrochlorate of morphine in the cherry-laurel water and mix the solution with the other ingredients.

SYRUPUS MANNÆ (*Syrup of Manna*).

Manna	3
Sugar	16
Water	12

Dissolve the manna and sugar in the water and strain.

SYRUPUS MANNÆ COMPOSITUS (*Compound Syrup of Manna*).

[Syrupus Sennæ Compositus. Syrup of Senna and Manna].

Senna	24
Fennel	3
Manna	50
Sugar	200
Water	q.s.

Pour 100 parts of boiling water upon the senna and fennel, allow to macerate half an hour, then strain and pass enough water through the strainer to obtain 108 parts of liquid. In this dissolve the manna and sugar. Finally strain.

SYRUPUS FERRI OXIDI (*Syrup of Oxide of Iron*).

Solution of chloride of iron (ferric), specific gravity 1·480–1·484	12
Water of ammonia	14
Sugar	85
Distilled water	q.s.

Mix the solution of chloride of iron with 120 parts of distilled water. Add to it slowly, under constant stirring, the water of ammonia previously diluted with 140 parts of distilled water. Collect the precipitate, wash it with distilled water until it ceases to produce a cloudiness in test-solution of nitrate of silver, and mix it with the sugar in a porcelain capsule. Warm the mixture for a few hours on the water-bath, occasionally stirring, then boil it gently, with occasional addition of distilled water, until one drop diluted with distilled water yields a clear, light-brown solution. Then dilute the syrup with warm distilled water until it weighs 136 parts.

Preserve the syrup in well-stopped bottles in a dark place.

One part of the syrup diluted with 5 parts of water should not produce a precipitate.

Fifty parts of the syrup contain 1 part of ferric oxide.

SYRUPUS CALCII PHOSPHATIS (*Syrup of Phosphate of Calcium*).

Phosphate of calcium	1
Phosphoric acid	3
Syrup	q.s.

Digest the phosphate of calcium with 6 parts of syrup and the phosphoric acid on the water-bath, occasionally stirring until the salt is dissolved; then add 400 parts of syrup.

SYRUPUS RHAMNI CATHARTICI (*Syrup of Buckthorn*).

Juice of buckthorn berries, fermented and clarified	8
Sugar	15

Dissolve the sugar in the juice.

QUINIÆ TANNAS NEUTER (*Neutral Tannate of Quinine*).

Sulphate of quinine	1
Diluted sulphuric acid, about	1
Tannic acid	4
Solution of acetate of ammonium	3
Distilled water	q.s.

Dissolve the sulphate of quinine in 70 parts of distilled water, with the aid of diluted sulphuric acid, avoiding an excess. Add to the solution the tannic acid, previously dissolved in 100 parts of distilled water, and afterwards the solution of acetate of ammonium, previously diluted with 8 parts of distilled water.

[The solution of acetate of ammonium is prepared by saturating water of ammonia (specific gravity 0·956–0·960) with acetic acid (specific gravity 1·051–1·055), about 9 parts of the latter being required for 10 parts of the former.]

Let the mixture stand for five hours, occasionally stirring. Collect the precipitate upon a filter, and wash it with small quantities of distilled water successively poured on, until a little of the precipitate removed from the filter, and dried, seems to have a bitter taste. Then dry it by exposure to air, and rub it to powder.

The resulting tannate of quinine is a yellowish-white, odourless, and almost tasteless powder, containing 8 to 10 per cent. of water, and which should yield 19 to 21 per cent. of anhydrous quinine, when it is assayed by the following process:—

Mix 1 part of tannate of quinine, in a test-tube, with 10 parts of solution of soda (of 6 per cent.), and warm the mixture on the water-bath for fifteen minutes. Add to it, when cold, 30 parts of chloroform, shake well, and transfer the whole to a separating funnel. As soon as the chloroform has become clear, let 15 parts of it run out and evaporate this portion upon the water-bath to dryness. Then weigh the residue.

This residue, corresponding to a quantity of anhydrous quinine contained in one-half part of the tannate, when dissolved in a little water acidulated with sulphuric acid, then treated with 2 parts of ether and an excess of ammonia, should yield a clear liquid separating into two layers.

The Pharmaceutical Journal.

SATURDAY, AUGUST 12, 1882.

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

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

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PAPERS TO BE READ AT THE MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.

THE following is a list of the titles of papers to be read at the approaching Pharmaceutical Conference at Southampton. It has reached us only at the moment of going to press and consequently it is only by inserting it here that we are able to publish the list this week. We regret to notice that the papers expected from Mr. J. E. HOWARD and from Mr. GREENISH have been withdrawn; but notwithstanding their loss it may, we think, be fairly assumed, on the basis of the list now presented, that the character of the communications brought before the British Pharmaceutical Conference will be fairly maintained. All the papers here mentioned may be looked upon as dealing with purely pharmaceutical subjects, and we are especially glad to notice that the somewhat trying experience of Mr. PROCTOR last year has not prevented him from coming to the front again in a less troubled arena than that of pharmaceutical politics.

1. A New Styptic of Indigenous Growth. By Professor QUINLAN, M.D., etc.
2. The Solubility of Morphia Salts. By Mr. D. B. DOTT.
3. Terpin Hydrate: its Preparation and Crystallography. By Mr. R. H. PARKER.
4. Variations in Strength of Commercial Samples of Tinctura Opii, B.P., and Extractum Opii Liquidum, B.P. By Mr. J. WOODLAND, F.L.S., F.C.S.
5. The Purity of the Salts of Silver as met with in Commerce. By Mr. J. WOODLAND, F.L.S., F.C.S.
6. The Purity of Commercial Chloride of Gold. By Mr. F. W. BRANSON.
7. Note on a Commercial Sample of Liquor of Iodide of Iron containing some Impurities probably added with a view of retarding or hiding its Oxidation. By Mr. B. S. PROCTOR.
8. Note on Methyl Orange as an Indicator of the Neutrality of Salts having an Acid Reaction with ordinary Test-papers. By Mr. B. S. PROCTOR.
9. Some Experiments on English Oil of Lavender. By Mr. W. A. SHENSTONE, F.I.C., F.C.S.
10. Vegetable Organisms in Solutions of certain Inorganic Salts. By Mr. A. H. BOTHAMLEY.
11. The Solubility of Boric Acid in Glycerine. By Mr. D. HOOPER.
12. The Iodides of Bismuth. By Mr. F. W. FLETCHER, F.C.S.
13. On some Reactions of Arsenic. By Mr. W. A. H. NAYLOR, F.C.S., and Mr. J. O. BRAITHWAITE.
14. Notes on Brazilian Drugs. By Dr. C. SYMES, F.C.S.
15. Some Results of the Action of the Digestive Ferments on Drugs. By Mr. G. BROWNEN, F.C.S.
16. First Report on the Difference between the Essential Oils of Cinnamon and Cassia. By Mr. A. H. JACKSON, B.Sc.
17. Remarks on Aconitum Napellus and Allied Species. By Mr. E. M. HOLMES, F.L.S.
18. On a New Method of Making the Volumetric Solution for Estimating Hardness of Water. By Professor C. R. C. TICHBORNE, Ph.D., etc.
19. On Ammoniated Extract of Ergot. By Mr. A. W. GERRARD, F.C.S.
20. On the Alkaloidal Value of Belladonna Plants at Various Periods of Growth. By Mr. A. W. GERRARD, F.C.S.
21. Contribution to the Pharmacy of the Pomegranate. By Mr. L. SIEBOLD, F.I.C., F.C.S.

A PROPOSED NEW MODE OF CONDUCTING THE PRELIMINARY EXAMINATION.

A SCHEME for the granting of junior certificates on the basis of examination conducted under the control of the Oxford and Cambridge Schools Examination Board has lately been drawn up in a tentative form by that body with a view of establishing a general system of examination to serve in lieu of the ordinary entrance examinations to the various professions. It appears that the Board, having been asked to institute such a system of examination, has passed a resolution in favour of doing so, provided satisfactory evidence is furnished that such a proceeding is desired by the masters of schools, further that the certificates granted under the system will be accepted by the public bodies interested, and lastly that adequate supervision of the candidates can be provided.

As regards the first point the Board has ascertained that such an examination is very generally desired by schools, and the Board has received many suggestions from schoolmasters respecting the details of the contemplated scheme. Most of those suggestions have been adopted and embodied in the provisional regulations which have been drawn up by the Board, and the question now to be determined is, how far the various bodies which demand the passing of a preliminary examination as the first step towards admission to the practice of the particular pursuits with which they have to do, will be willing to grant exemption from their own preliminary examinations in favour of candidates holding a certificate which has been gained at an examination conducted according to the regulations of the Oxford and Cambridge Examination Board and provided that each certificate shows that the applicant has passed in such subjects as are equivalent to those required for the preliminary examination. In order to ascertain what

is the disposition of the various bodies in this respect the Secretaries of the Board have been instructed to communicate with those bodies, submitting a draft of the provisional regulations proposed and a statement of the subjects which the Board considers to be equivalent to those required in the preliminary examinations of the several bodies.

The Pharmaceutical Society, being one of those bodies which require the passing of a preliminary examination as a step towards the qualification they grant, it has been applied to in this manner by the Board, with a request that the subject should be brought before the Council, and a reply given as soon as possible, stating the opinion of the Council in regard to the project.

The Preliminary examination of the Pharmaceutical Society is so important a feature of the ordeal through which a candidate for pharmaceutical qualification has to pass and that examination is capable of being made to exercise such a beneficial influence upon the educational system, as well as upon the future of pharmacy in this country, that it becomes highly desirable to consider this scheme for carrying out the examination in a different, and may be better, manner than heretofore.

According to the draft which has been submitted for general consideration, it is proposed that the examination shall commence on the 23rd day of July, 1883, and that it shall extend over six days, according to a time table specifying the days allotted to particular subjects. The examination is to be conducted entirely by means of printed papers to be set at Oxford, Cambridge, or such other centres as the Board may appoint, and at every school the authorities of which desire that these papers shall form part of a school examination. In regard to this latter case the very important proviso is made that the papers must be worked under the superintendence of a supervisor appointed by the Board. In the letter addressed to the Pharmaceutical Society in common with other bodies, it is suggested that with the view of reducing the expense of the examination it might be desired in certain cases to make the head masters of the schools responsible for the supervision of the candidates, and it is asked whether such an arrangement would be considered satisfactory. On the face of the matter we can scarcely conceive what cases would render such a course either desirable or satisfactory and the responsibility thus thrown upon the head masters of schools would be one of a very serious and difficult nature.

In carrying out the scheme it is proposed that any of the boys under education at a school shall be admitted to the examination on the application of the head master of the school, made not less than two months before the time fixed for its commencement. The examination to include Latin, Greek, French and German as the first group of subjects; Arithmetic and additional Mathematics as the second group; Scripture Knowledge, English, English History and Geography as the third group; Physics and Chemistry as the fourth group. In order to obtain a certificate a boy will be required to satisfy the examiners in five subjects taken from not less than three groups, of which the groups 1 and 2 must be two, and the boys will be required to answer the questions so as to satisfy the examiners that they have an adequate knowledge of English grammar and orthography. In each subject there are to be two classes, and the certificates will specify the age of the boy, the subjects in which he has passed, and the class he has obtained in each. A fee of one guinea is to be paid for every boy examined when the examination is held at a school, and if a boy is examined away from his own school an additional fee of ten shillings is to be paid.

These are the general features of the scheme, and as regards the Preliminary examination of the Pharmaceutical Society, the subjects considered to be equivalent to those which it requires are Latin, Arithmetic and English, class one or two. It will be seen from the report of the Council proceedings last week that the Council is considering the scheme, and has entered into communication with the Board upon the subject.

WHO IS RESPONSIBLE FOR POISONING BY IMPURE WATER?

A CASE of very great interest has recently been before the Assizes at Leeds, in which the corporation of Huddersfield was proceeded against for negligence and failure in the performance of a statutory duty to supply pure and wholesome water. The complaint against the water was that as supplied for use in the plaintiff's house it contained lead to such an extent that he had been made dangerously ill and had suffered serious physical injury. Upon that ground he claimed damages from the corporation, and in the hearing of the case it became clear not only that the injuries of the plaintiff were real, but that they had resulted from the presence of lead in the water supplied by the defendant corporation. The only point of issue between the plaintiff and defendants was the question whether the impurity arose in the mains or in the service pipe, and if in the latter whether the corporation was responsible. It was agreed to reserve this point for further consideration and on the evidence the jury found a verdict for the plaintiff with two thousand pounds damages.

So far as the report of the evidence can be relied upon it appears that the water supplied to Huddersfield is soft water and that some portion of it is drawn from a source that is subject to contamination with sulphuric acid; but whether the presence of lead in the water is attributed to this circumstance or not is scarcely clear. One of the witnesses stated that he had pointed out certain objectionable features in some part of the water supply which the corporation had not paid attention to; but the particulars are not stated and we must therefore defer any further account of the case until fuller information is obtained.

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.

Electric Railways.

BY PROFESSOR W. E. AYRTON, F.R.S.

We have grown so accustomed to the regular announcement—"serious accident on such and such a railway, several passengers injured"—that we have almost come to regard railway accidents as inevitable, just as parents mistakenly think the measles and whooping cough necessary accompaniments of childhood. But speed no more means disaster than a densely crowded city means disease. The first effect of overcrowding is undoubtedly to produce fever and other complaints. If, however, the knowledge and practice of the laws of hygiene increase more rapidly than the population of a town, the death rate, as we have seen, diminishes, instead of augmenting. And so it is with locomotion; the stage-coach journeys of our ancestors were slow enough for the most staunch conservative, and yet the percentage of the passengers injured on their journeys was far greater than even now with our harum-scarum railway travelling. The number of passengers has increased enormously, but the safety has increased in an even greater rate. If then we can devise methods introducing still greater security, a far larger number of passengers may travel at a far greater speed and with less fear of danger than at present.

Accidents constitute one charge against railway conveyance, but there is another, and that is the cost. Cheap as railway travelling now is, compared with the departed stage-coach locomotion, the price of the tickets is still far too high for railways to fulfil, even in a small degree, one of their most important functions, and that is transporting labourers from parts of the country where labour is scarce, to others where it is abundant and labourers in demand.

But how is a happier state of things to be realized? We cannot expect the railway companies to lower their fares merely to benefit humanity. If, however, we can prove to them that the present system of railways is neither the most remunerative to themselves nor the most beneficial to the community at large, we may hope to win the attention of railway directors, whose stock question is, and quite rightly, "Will it pay?"

Those of you who have read the life of Stephenson know what a protracted fight he had to carry one of his most cherished ideas, and that was the employment of a locomotive engine to draw the train instead of a stationary engine to pull it with ropes or chains. His adversaries saw the disadvantage of adding the weight of the locomotive to the weight of the train, whereas Stephenson was especially struck with the enormous waste of power in the friction of ropes or chains passing over pulleys. [Experiments were then shown proving, *first*, that the mass of the locomotive necessitated the engine having a greater horse-power to get up the speed of the train quickly as well as a greater horse-power to keep up the speed; *secondly*, that the friction and wear and tear of ropes, such as were employed on the London and Blackwall Railway, would have been an insuperable hindrance to the development of railways.] From this was deduced that, since in Stephenson's day the only feasible mode of communicating the power of a stationary engine to a moving train was by means of ropes, his decision to adopt the locomotive was perfectly correct at the time it was made.

Attempts have been made to propel trains by blowing them through tubes, or by blowing a piston attached to the train through a tube, but such attempts at pneumatic railways have nearly all been abandoned. The employment of air compressed into a receiver on the train by fixed pumping engines stationed at various points along the line, and employed to work compressed air-engines on the carriages has been effected with considerable success by Colonel Beaumont, especially for tram-lines. The weight of the compressed air engine is, however, still very considerable. Any system of pumping water through a pipe and employing the water to work a hydraulic engine on the train is hardly worth considering, seeing that the mechanical difficulties of keeping up a continuous connection between the moving train and the main through which the water is pumped seem insuperable. Gas engines worked with ordinary coal gas, stored perhaps under pressure, might be employed on the moving train, but the advantage arising from the absence of boiler and coal would be more than compensated for by the fact, that the weight of a gas-engine per horse-power developed is so much greater than that of a steam-engine. None of these systems, then, of dispensing with a locomotive is by any means perfect, and the success of the recent experiments on the electric transmission of power has turned the attention of engineers to the consideration, whether electricity could not successfully supplant steam for the propulsion of trains and tram-cars; whether it could not, in fact, supply an efficient means of transmitting power, the absence of which caused Stephenson to abandon ropes in favour of a heavy locomotive engine.

The whole question, like every similar one, is mainly a question of expense; and what we have to consider is, whether electric transmission on the whole leads to greater economy than can possibly be obtained by the employment of any kind of locomotive. The average weight of a locomotive is about that of six carriages full of people; ten carriages compose an ordinary train, hence the presence of the mass of the locomotive adds at least 50 per cent. to the horse-power absolutely necessary to propel the carriages alone, and therefore at least 50 per cent. to the amount of coal burned. But there is another most serious objection to the engines, perhaps even more important than the preceding. The heavy engine passing over every part of the line necessitates the whole line and all the bridges being made many times as strong, and therefore many times as costly, and the expense of maintenance consequently also far greater, than if there were no locomotive. And it is not possible to make the engine much lighter; for it would not have then sufficient adhesion with the rails to be able to draw the train; in fact, you cannot diminish the weight as long as the train is propelled with only one or two pair of driving wheels as at present. The employment of electricity, however, will enable a train to be driven with every pair of wheels, just as the employment of compressed air enables every pair of wheels to brake the train.

To propel a train we must either utilize the energy of coal by burning it, or use the energy possessed by a mountain stream, or the energy stored up in chemicals, and which is given out when the chemicals are allowed to combine, or we must employ the energy of the wind. Practically we employ at present only the first store for propelling railway trains—the potential energy of coal; and that is to a great extent the store on which we shall still draw, even when we employ electric railways. For experience shows that with the modern steam-engine and dynamo at least one-twentieth of the energy in coal can be converted into electric energy; and that this is at least twenty times as economical as the direct conversion of the energy of zinc into electric energy by burning it in a galvanic battery.

But it may be asked, did not Faraday's discovery in 1831 that a current could be produced by the relative motion of a magnet and a coil of wire settle this point half a century ago? Theoretically—yes; practically, however, the problem was very far from being solved, because the dynamo machine was very unsatisfactory, and it was not until Pacinotti, in 1860, suggested the solution of the problem of obtaining a practically continuous current from a number of intermittent currents, and until Gramme, about 1870, carried out Pacinotti's

* Abstract of a Lecture delivered on Friday, March 24, 1882, at the Royal Institution, and before the Royal Dublin Society, March 31.

suggestion in the actual construction of large working machines, that the mechanical production of currents became commercially possible. [Experiments were then shown illustrating the complete electric transmission of power, a gas-engine on the platform giving rapid motion to a magneto-electric machine, and the current thereby produced sent through an electro-motor at the other end of the room, which worked an ordinary lathe.]

In electric transmission of power there is not only waste of power from mechanical friction, but also from electric friction arising from the electric current heating the wire, through which it passed.

It was then explained and demonstrated experimentally that this latter waste could be made extremely small by placing so light a load on the electro-motor that it ran nearly as fast as the generator or dynamo which converted the mechanical energy into electric energy; actual experiments leading to the result that for every foot-pound of work done by the steam-engine on the generator quite $\frac{7}{10}$ of a foot-pound of work can be done by the distant motor.

One reason why electric transmission of power can be effected with so little waste is because electricity has apparently no mass, and consequently no inertia; there is, therefore, no waste of power in making it go round a corner, as there is with water or with any kind of material fluid. Another reason why electro-motors are so valuable for travelling machinery is on account of the light weight of the motor. Experiment shows that one horse-power can be developed per 50 lbs. of dead weight of electro-motor; a result immensely more favourable than can be obtained with steam, gas, or compressed-air engines.

In addition to the loss of power arising from the heating of the wires by the passage of the current there is another kind of loss that may be most serious in the case of a long electric railway, viz. that arising from actual leakage of the electricity due to defective insulation. To send an electric current through a distant motor, two wires, a "going" and "return" wire must be employed, insulated from one another by silk, guttapercha, or some insulating substance; and if the motor be on a moving train there must be some means of keeping up continuous connection between the two ends of the moving electro-motor and the going and return wire. The simplest plan is to use the two rails as the two wires, and make connection with the motor through the wheels of the train; those on one side being well insulated from those of the other, otherwise the current would pass through the axles of the wheels instead of through the motor. It is this simple plan that is employed in Siemens' Lichterfelde Electric Railway, now running at Berlin; the insulation arising from the rails being merely laid on wooden sleepers having been found sufficient for the short length, 1½ mile. The car is similar to an ordinary tram-car, and holds twenty passengers. [Photographs were then projected on the screen of this and of the original electric railway laid by Siemens in the grounds of the Berlin Exhibition of 1879, and exhibited in 1881 at the Crystal Palace, Sydenham.] It was explained that on this latter railway, which was 900 yards long, both the ordinary rails were used as the return wire, and that the going wire was a third insulated rail rubbed by the passing train. [Photographs were then projected on the screen of Siemens' electric tram-car at Paris, used to carry fifty passengers backwards and forwards last year to the Electrical Exhibition.] In this the going and return wires were overhead and insulated, connection being maintained between them and the moving car by two light wires attached to the car, and which pulled along two little carriages running on the overhead insulated wires, and making electric contact with them. [Experiments followed, proving that although two bare wires lying on the ground could be quite efficiently employed as the going and return wire, if the wires were short and the ground dry, the leakage that occurred if the wires were long and the ground moist was so great, as to more than compensate for the absence of the locomotive.] Consequently Professor Perry and myself have for some time past been working out practical means for overcoming these difficulties, and we have arrived at what we hope is an extremely satisfactory solution. Instead of supplying electricity to one very long, not very well insulated rail, we lay by the side of our railway line a well insulated cable, which conveys the main current. The rail, which is rubbed by the moving train, and which supplies it with electric energy, we subdivide into a number of sections, each fairly well insulated from its neighbour and from the ground; and we arrange that at any moment only that section or sections, which is in the immediate neighbourhood of the train, is connected with the main cable; the connection being of course made automatically with the moving train. As then leakage to the earth of the strong propelling electric current can only take place from that section or sections of the rail which is in the immediate neighbourhood of the train, the loss of power by leakage is very much less than in the case of a single imperfectly insulated rail, such as has been hitherto employed, and which being of great length, with its correspondingly large number of points of support, would offer endless points of escape to the motive current.

Dr. Siemens has experimentally demonstrated that an electric railway can be used for a mile or two; Professor Perry and myself, by keeping in mind the two essentials of success, viz. attention to both the mechanical and electrical details, have, we venture to think, devised means for reducing the leakage on the longest railway to less than what it would be on the shortest.

For the purpose of automatically making connection between the main well-insulated cable and the rubbed rail in the neighbourhood of the moving train, we have devised various means, one of which is the following:—

A copper or other metallic rod forming an auxiliary rail, rests on the top of and is fastened to a corrugated tempered steel disc (of the nature of, but of course immensely stronger than the corrugated top of the vacuum box of an aneroid barometer), and which is carried by and fastened to a thick ring made of ebonite or other insulating material. The ebonite ring is itself screwed to the circular cast-iron box, which latter is fastened to the ordinary railway sleepers. The auxiliary rail and the corrugated steel discs have sufficient flexibility that two or more of the latter are simultaneously depressed by an insulated collecting brush or roller carried by one or by all of the carriages. Depressing any of the corrugated steel discs brings a stud, which is electrically connected with the metallic rod or auxiliary rail, into contact with another stud electrically connected with the well-insulated cable.

As only a short piece of the auxiliary rail is at any moment in connection with the main cable, the insulation of the ebonite ring will be sufficient even in wet weather, and the cast-iron box is sufficiently high that the flooding of the line or the deposit of snow does not affect the insulation. The insulation, however, of the stud, which is permanently in connection with the main cable, must be far better. For this purpose we lead the guttapercha, or indiarubber, covered wire coming from the main cable through the centre of a specially formed telegraph insulator, and cause it to adhere to the inside of the earthenware tube forming the stalk. And as, in addition, the inside of each contact box is dry, a very perfect insulation is maintained for the lead coming from the main cable. Consequently as all leakage is eliminated except in the immediate neighbourhood of the train, this system can be employed for the very longest electric railways. In a modification of the contact box, the insulated rail instead of extending all along the line is quite short and is carried by the train, and by its motion presses forwards and downwards a metallic fork on the contact box, thus making contact between the two

studs. [Other diagrams were explained, illustrating modifications of the contact boxes, in one case the well-insulated cable is carried inside the flexible rail, which then takes the form of a tube. In another case the cable is insulated with paraffin oil instead of with guttapercha or indiarubber.]

The existence of these contact boxes at every 20 to 50 feet also enables the train to graphically record its position at any moment on a map hanging up at the terminus, or in a signal box or elsewhere, by a shadow which creeps along the map of the line as the train advances; stops when the train stops; and backs when the train backs. This is effected thus:—as the train passes along, not only is the main contact between the two studs automatically made, as already described, but an auxiliary contact is also completed by the depression of the lid of the contact box, and which has the effect of putting, at each contact box in succession, an earth fault on an insulated thin auxiliary wire running by the side of the line And just as the position of an earth fault can be accurately determined by electrical testing at the end of the line, so we arrange that the moving position of the earth fault, that is the position of the train itself, is automatically recorded by the pointer of a galvanometer moving behind a screen or map, in which is cut out a slit representing by its shape and length the section of the line on which the train is. In addition, then, to the small sections of 20 feet or more into which our auxiliary rubbed rail is electrically divided, there would be certain long blocked sections, 1 mile or several miles in length, for each of which on the map a separate galvanometer and pointer would be provided. [Experiments were shown of the system of graphically automatically recording the progress of a train.]

In the preceding systems there are several contact boxes in each section of the insulated rubbed rail, and several sections of the insulated rail in each section of the line blocked, but in the next system the rubbed rail is simply divided electrically into long sections each of as great a length as the particular system employed to insulate the rubbed rail will allow. In this case we arrange that the electric connection between the main cable and the rubbed conductor shall be automatically made by the train as it enters a section, and automatically broken as the train leaves a section. The model before you, shown in the accompanying figure, is divided into four sections, each about 11 feet in length, and you see from the current detectors that as the train runs either way it puts current into the section just entered, and takes off current from the section just left.

[Experiments were then shown of the ease with which an electric train could be made to back instead of going forwards, by reversing the connections between the revolving armatures and the fixed electro-magnets of the motor; also that the accidental reversal of the field magnets of the main stationary generator, although it had the effect of reversing the main current, produced no change in the direction of motion of an electric engine, the direction of motion being solely under the control of the driver.]

But more than this, not only does the train take off current from the section 1 when it is just leaving it, and entering section 2, but no following train entering section 1 can receive current or motive power until the preceding train has entered section 3. [Experiments were then shown proving that with this system a following train could not possibly run into a preceding train even if the preceding train stopped or backed.] Now why does the following train when it runs on to a blocked section pull up so quickly? The reason is because it is not only deprived of all motive power, but is powerfully braked, since when electricity is cut off from a section the insulated and non-insulated rail of that section are automatically connected together, so that when the train runs on to a blocked section the electro-motor becomes a generator short circuited on itself, producing, therefore, a powerful current which rapidly pulls up the engine. [Experiments were then shown of the speed with which an electro-moter, which had been set in rapid rotation and then deprived of its motive current, pulled up when its two terminals were short circuited.]

Whenever, then, a train, it may be even a runaway engine, enters on a blocked section, not only is all motive power withdrawn from it, but it is automatically powerfully braked, quite independently of the action of the engine-driver, guard, or signalman. No fog, nor colour-blindness, nor different codes of signals on different lines, nor mistakes arising from the exhausted nervous condition of overworked signalmen, can with this system produce a collision. The English system of blocking is merely giving an order to stop a train; but whether this is understood or intelligently carried out is only settled by the happening or non-happening of a subsequent collision. Our Absolute Automatic Block acts as if the steam were automatically shut off and the brake put on whenever the train is running into danger; nay, it does more than this—it acts as if the fires were put out, and all the coal taken away, since it is quite out of the power of the engine driver to re-start his train until the one in front is at a safe distance ahead.

But all trains will undoubtedly be lighted with electricity; must, then, the train be plunged into darkness when it runs on to a blocked section to which no electric energy is being supplied? No! If some of the electric energy supplied to the train when it is on an unblocked section be stored up in Faure's accumulators, such as are at present used on the Brighton Pullman train, the lamps will continue burning even when the train has ceased to receive electric energy from the rubbed rail.

When, then, we commit the carrying of our power to that fleet messenger to which we have been accustomed to entrust the carrying of our thoughts, then shall we have railways that will combine speed, economy and safety; and last, but not least to us Londoners, we shall have the entire absence of smoke, the presence of which nearly causes the convenience of the Underground Railway to be balanced by the pernicious character of its atmosphere.

PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

Notes on the Useful American Myrtles.*

BY JOHN M. MAISCH.

After referring to the statement in Mr. Riise's paper on bay rum (see before, p. 39), relating to the varieties of the bayberry trce, scarcely to be distinguished botanically, the author continues:—

There being a large number of myrtles indigenous to the West Indies and many also to South America, it may not appear inappropriate to give a brief account of those American species which yield useful and more or less medicinal products. Since by far the largest number of these plants possess aromatic properties, and many of them are also astringent, it may be presumed that the majority of them could be employed medicinally; but in this sketch I shall confine my remarks to those only which have, at various times, attracted some attention in Europe or in this country.

The order Myrtaceæ has affinities, more or less intimate, with a number of other orders, and its limits are variously defined by different botanists, so as to embrace a larger or smaller number of tribes or sub-orders. Between seventeen hundred and eighteen hundred species belong to it, all of which, with but few exceptions, inhabit tropical countries.

The *Barringtoniea*, comprising tropical trees with opposite undotted leaves, are at present generally separated from the myrtles. They are often emetic and

* Read at a Meeting of the Association at Altoona, June 14, 1882.

stupefying, or bitter and astringent, and in some species an unpleasant odorous principle is prevalent.

The sub-order *Granateæ* or *Puniceæ* contains only a single species, the well-known pomegranate, which is indigenous to Western Asia, from Northern India to the Mediterranean, and is now cultivated everywhere in subtropical countries and the warm temperate zone. It is destitute of aromatic properties, the bark of the root and trunk as well as the rind of the fruit being anthelminthic and containing considerable tannin. Some botanists place this tree into a separate natural order, while others have united it with the order of Lythraceæ.

The sub-order *Lecythideæ* is likewise free from aromatic properties and is remarkable for the large woody fruits, which in some species open by a kind of lid, on which account they have been called *monkey-pots*. The seeds contain a considerable quantity of fixed oil, sometimes over 50 per cent., and are often edible, being of an almond-like flavour, though those of a few species are reputed to be more or less deleterious in their raw state. The well-known *Brazil nuts* or *Para nuts*, known as *touka* in Cayenne, as *juvia* on the Orinoco, and as *castanha do Pará* in Brazil, are the seeds of *Bertholletia excelsa*, Kunth. The so-called *Sapucaya nuts* are produced by *Lecythis Zabucajo*, Aublet, and of nearly the same flavour are the seeds of *Lecythis Ollaria*, Lin. The fruit of *Couroupita guianensis*, Aublet, is globular, attains a diameter of 6 or 8 inches and is known as *cannon ball*, *boulet de canon*; it contains in its nearly ripe condition a sweet acidulous pulp, furnishing a refreshing beverage, useful in febrile diseases. These trees are indigenous to South America.

The sub-order *Chamælaucieæ* has, like the following sub-orders, evergreen and mostly glandular-punctate leaves. The plants known as *fringe-myrtles* are shrubby, of a heath-like aspect, with small leaves, are indigenous to Australia and are not used medicinally.

The sub-order *Leptospermeæ* comprises, with very few exceptions, Australian trees and shrubs, with opposite or alternate leaves. The volatile oil of one species, *Melaleuca minor*, Smith, is the well-known *oil of cajaput*. The volatile oil distilled from the leaves of *Mel. ericæfolia*, Sm., *Mel. linariæfolia*, Sm., *Mel. Leucadendron*, Lin., and perhaps of other species, are very similar. The last-named species is known in Australia as *tea tree*, because the leaves are employed like tea; the *white tea tree* is *Mel. genistæfolia*, Sm. The leaves of different species of *Leptospermum*, like *L. scoparium*, Sm., *L. Thea*, Willdenow, and others are similarly used.

But the sub-order has attracted universal attention through the *Eucalyptus globulus*, Labillardière, which through its rapid growth, and perhaps also through the exhalation of its volatile oil, has been found useful in sub-tropical marshy countries for destroying malaria. The leaves of all species of this genus yield volatile oils, which sometimes differ widely in odour and composition. Several species yield astringent exudations, drying into a kino-like substance; the exudation of others contains more gummy matter, and of one or two species it is of a saccharine nature; the bast fibres of certain species have been found serviceable in the manufacture of paper.

Of the sub-order *Myrteæ*, there are not less than fifty-three species described by Grisebach, growing in the British West Indian Islands, all of which are more or less aromatic. The number growing in all the West Indian islands and in South America is much larger. The species best known throughout the civilized world is doubtless the clove, *Caryophyllus aromaticus*, Linné (s. *Eugenia caryophyllata*, Thunberg; *Myrtus caryophyllus*, Sprengel) which, though originally indigenous to the Molucca Islands, is now perfectly naturalized in the West Indies and South America. The unexpanded flower-buds, which constitute the cloves of commerce, contain, besides a considerable amount of tannin, an aromatic volatile oil, of which the eugenol or eugenic acid constitutes the most important part, and very similar constituents are met with in the less aromatic pedicels, known in commerce as *clove stalks*, and in the fruit known as *mother cloves* and *anthophylli*. That the allspice, the fruit of *Pimenta vulgaris*, Wight et Arnott, s. *Eugenia* (*Myrtus*, Lin.) *Pimenta*, De Cand., likewise contains a volatile oil, chemically identical with the oil of cloves, is well known; besides the fruit, the leaves are employed in the West Indies as a spice and in medicines, and the young straight shoots of the plant are largely exported to be used for walking canes. The same volatile oil seems to be present in the closely allied *Pimenta* (*Amomis*, Berg) *Pimento*, Grisebach, which differs from the preceding chiefly by its five-lobed calyx and by its longer ovate-oblong (instead of globular) fruit. The bayberry tree of the West Indies, *Pimenta acris*, W. et A., has, likewise, pentaphyllous flowers and a more ovoid fruit; however the coriaceous leaves are distinctly reticulate on the upper surface, and less distinctly so beneath, while the preceding species does not show any projecting veins above. The typical form of the bayberry tree has the young branchlets somewhat four-angled, while the variety pimentoides, which was formerly regarded as a distinct species, *Myrcia* (*Amomis*, Berg) *pimentoides*, DeC., s. *Myrtus* (*Eugenia*) *citrifolia*, Poir., has acute branchlets decurring from the petioles, and usually broader and more obovate leaves. The oil of bay, distilled from the leaves of the species mentioned, has been in the American market for about twenty years; that it contains eugenol was proven by Mr. R. Rother in 1876 (*Chic. Pharmacist*, p. 130), and this was corroborated by Professor Markoe in 1877 ('Proc. Am. Phar. Assoc.,' p. 435). The fruit contains the same volatile oil, and not unlikely also the flower-buds; at least the tree is known as *clove* in some of the West Indian Islands (Grisebach). These species and varieties possess almost identical stimulating properties, and may be substituted for one another in their applications as medicine or as spice, almost indiscriminately, or at least as far as the difference in flavour will permit.

The clove-like odour is not confined to the species mentioned before, but is met with in other plants, and doubtless depends upon the presence of eugenol. *Eugenia* (*Myrtus*, Gomez) *pseudo-caryophyllus*, DeC., and *Calyptranthes aromatica*, St. Hilaire, both indigenous to Brazil, and known there as *craveiro da terra*, possess this flavour, and the young flower-buds, particularly those of the latter, have been recommended as a good substitute for cloves; a clove-like flavour is observed in all its parts, and the ovate fruit is extensively employed both for culinary purposes and also in medicine.

While it is undoubtedly true that botanical relationship is often indicative of similar properties and composition, yet the odorous compounds met with in the volatile oils of nearly related species are often very dissimilar, if not in relation to their chemical nature, at least in their sensible properties, more particularly in their odour. Thus, for instance, *Myrcia* (*Myrtus*, Vahl) *coriacea*, De Cand., which grows in many of the West Indian Islands, so closely resembles the bayberry tree that it has been confounded with it by as thorough a botanist as Swartz, but the leaves have a lemon-like odour, entirely distinct from the allspice-like flavour of the former, and it is very obvious that the volatile oil or the spirit distilled from them must have very different properties from those of good oil of bay or of bay rum. The leaves, like those of other myrtles, vary considerably in shape, and are either oval, roundish-elliptic, or obovate, obtuse or emarginate, and usually opaque, though marked with impressed dots, some of which become finally pellucid; the veins are not conspicuous. and are usually joined near the revolute margin. There are several varieties, differing in the pubescence of the branchlets and petioles, in the length of the peduncles, and the number of flowers borne by them. The leaves possess antiseptic and astringent properties, the bark is employed

for tanning, and the wood is used for dyeing yellow, green and brown.

Eugenia (*Myrtus*, Swartz) *glabrata*, De Cand., is acidulous aromatic in all its parts, more particularly the black oblong berries.

Eugenia (*Myrtus*, Swartz) *procera*, Poir., which is found in Jamaica and adjacent islands, and also in Southern Florida, has pellucid-punctate leaves, which finally become leathery and opaque and then have but a slight odour, while the flowers are very fragrant.

Eugenia (*Myrtus*, Sprengel) *fœtida*, Persoon, of Guiana, has leaves possessing a disagreeable odour, a property rarely met with among the myrtles.

Anamomis (*Myrtus*, Swartz; *Eugenia*, Willdenow), *fragrans*, Grisebach, grows in mountainous regions from Jamaica southward to Guiana; its rigid variable leaves are of a strong balsamic flavour, and are employed both externally and internally. The variety *cuncata*, s. *Eug. emarginata*, Macfillan, is known as *zebra wood*.

The odour of the flowers of *Eugenia* (*Myrtus*, Swartz) *virgultosa*, De Cand., indigenous to Cuba and Jamaica, resembles that of rhubarb.

Eugenia (*Myrtus*, Swartz) *disticha*, De Cand., is known in Jamaica as *wild coffee*, because the red ovoid berries, which are about ¼ inch long, resemble the fruit of coffee and the fresh seeds have a similar taste.

Eugenia (*Myrtus*, Swartz) *Gregii*, De Cand., has oblong or roundish-ovate berries of a leathery texture and a strongly acrid-aromatic flavour. Acrid-aromatic properties are likewise found in the root and seeds of *Eugenia* (*Myrtus*, Sprengel) *angustifolia*, Lam., which grows in San Domingo.

The yellow depressed-globose berries of the Brazilian *Eugenia* (*Myrtus*, Martius) *dysenterica*, De Cand., are of an agreeable acidulous taste, but are apt to produce diarrhœa. The red or yellow berries of the West Indian *Eugenia floribunda*, West, are sweet and acidulous, are eaten raw and cooked, and on fermentation yield a pleasant vinous beverage. Eatable berries are also produced by several other West Indian species of *Eugenia*, the most important of which appear to be *Eugenia* (*Myrtus*, Swartz) *ligustrina*, Wild., s. *Myrtus cerasina*, Vahl., with a black two-seeded fruit called *pitangueira do mato* in Brazil; *Eugenia* (*Myrtus*, Swartz) *lineata*, De Cand., with a scarlet-red cherry-like but several-seeded fruit; and *Eugenia uniflora*, Lin., s. *Eugenia Michelii*, with a red-furrow one-seeded fruit, which is known in some parts as *Cayenne cherry*, and in Brazil as *pitangueira*; the last-named species is also distributed over a considerable portion of tropical South America, and has been naturalized in the East Indies. In like manner are also used the violet-purplish plum-sized berries of the Brazilian *Eugenia* (*Myrtus*, Martius) *cauliflora*, De Cand., known as *jabuticaba*.

One of the myrtles of tropical America has been introduced into and naturalized in most other tropical countries, where it is highly valued on account of its fruit, which resembles a medium-sized pear, with a downy, veined, brittle and thin rind, and containing a whitish, yellowish or reddish pulp, of a very agreeable sweet, acidulous and aromatic flavour. The fruit is known as *bay plum*, *guava* or *guayava*, and in Brazil as *aracá mirim* and *aracá goiaba*. It comes from a small tree, the *Psidium Guava*, Raddi, under which name two or three nominal species are comprised, chiefly distinguished by the shape of the fruit; this is either pyriform or globular, the latter apple-shaped or red guava being regarded as rather inferior to the former, or white guava. The unripe fruit is astringent, and is employed like other astringents; the young leaves and buds have similar properties, also the root and the bark, and are used both internally and externally. The white guava is most esteemed for eating in the raw state; but the pulp of both varieties is used in the West Indies in the preparation of two kinds of preserve, which are known as guava jelly and guava cheese, and furnish a not unimportant article of commerce.

The dark red spherical, well-flavoured fruit of *Psidium Cattleyanum*, Sabine, has the size of a large plum, and on account of its purplish pulp is known as purple guava, and in Brazil as *arácaseiro do campo*; it is indigenous to Brazil and naturalized in China.

Psidium guineense, Swartz, is cultivated in the West Indies for its somewhat smaller, dark yellow and internally red berry, and the fruit of *Eugenia* (*Myrtus*, Sprengel) *pseudo-psidium*, Jacquin, is esteemed there under the name of *bastard guava*.

Psidium montanum, Swartz, the *mountain guava* of Jamaica, has a globular fruit, scarcely ½ inch in diameter, which, like the flowers, has a bitter almond odour. A species of St. Vincent, *Psidium Guildingianum*, Grisebach, with small berries, only ¼ inch thick, has in its habit considerable resemblance to *Myrcia coriacea* and *Pimenta acris*, but the rigid leaves are devoid of pellucid dots.

Campomanesia (*Psidium*, Aublet) *aromatica*, Grisebach, has yellow globular eatable berries, and a foliage of a balm-like odour. The similar fruit of *Campomanesia lineatifolia*, Ruiz et Pavon, is known in Peru as *palillo*, and that of *Camp. cornifolia*, Kunth, in New Grenada, as *guyavo de Anselmo*.

In this connection should also be mentioned the *rose apple* and *Malay* or *Otaheïte apple*, which have been naturalized in the West Indian Islands, and there, as in tropical Asia, their native country, are highly valued on account of their agreeable taste and rose-like odour. The former, *Jambosa vulgaris*, De Cand., s. *Eugenia* (*Myrtus*, Kunth) *Jambos*, Lin., is a globular or oval yellowish or reddish berry, about 1½ inch in diameter; the latter *Jambosa* (*Eugenia*, Lin.; *Myrtus*, Sprengel) *malaccensis*, De Cand., is pear-shaped or top-shaped, 3 or 4 inches long, of a crimson or blackish-red colour externally, and with a white, juicy pulp.

The bark and leaves of both species possess strongly astringent properties, and the seeds are aromatic and acrid. The fruit of several other species indigenous to tropical Asia is employed there like those mentioned.

The jambolana, *Syzygium* (*Eugenia*, Lam., *Calyptranthes*, Wild.) *Jambolanum*, De Cand., is also naturalized in Jamaica and other West Indian islands. The dark red oval and somewhat curved fruit is of the size of a large cherry, has an astringent, acidulous taste, and is employed in gargles; the bark, notably that of the root, is astringent and aromatic. Several other species of this genus, mostly indigenous to tropical Asia, bear eatable berries.

The plants of the genus *Myrtus*, to which the frequently cultivated common myrtle of Southern Europe, *Myrtus communis*, Lin., belongs, have, likewise, aromatic and astringent properties, and their berries are in some cases eatable, like *Myrtus Luma*, Mill., whose fruit is very palatable; *Myrtus microphylla*, Humb. et Bonpl., the red berries of which are of the size of a pea and very sweet, and *Myrtus Ugni*, Molina, which has thicker brown-red berries, of a faint rosemary odour; these species are indigenous to Chili and Peru, and the leaves of the *ugni* are used as a substitute for tea. The *guayavo arayan* of the Orinoco valley is *Myrtus salutaris*, Kunth, the root of which is highly valued as an astringent.

Somewhat similar properties are possessed by a Chilian plant called *chcken* or *chekan*, which enjoys a local reputation, and the use of which in Europe and in North America has been recently revived. *Eugenia Chcken*, Molina, is a small shrub, about 4 feet high, with a rough, brown, strongly astringent bark; the leaves are sessile, about an inch long, elliptic or roundish, somewhat narrowed at both ends, delicately feather-veined, light green and smooth; the peduncles are axillary and terminal, five or six-flowered; the berries are globular, about ⅓ inch thick, externally black, and contain two somewhat heart-shaped seeds. The barks and the leaves have been employed internally in indigestion, diarrhœa and various other affections of the bowels and kidneys, and externally,

in the form of fomentations, in ophthalmic inflammations, rheumatic and other pains, and more recently, as inhalations of the vapours from the aqueous infusion, in bronchitis, laryngitis and diphtheria.

Very few myrtles are indigenous, but none peculiar to the United States. The five species, enumerated in Chapman's 'Flora,' are small trees, confined to Southern Florida. They are *Eugenia dichotoma*, De Cand.; *Eug. procera*, Poir.; *Eug. monticola*, De Cand.; *Eug. buxifolia*, Willd., and *Calyptranthes* (*Myrtus*, Lin.) *Chytraculia*, Swartz. Not a single myrtle has been found indigenous to California, though the climate is well suited for the growth of different species of *Eucalyptus*, and doubtless of other genera of this interesting and useful natural order. The States bordering the Mexican Gulf may likewise be adapted for the acclimatization of some of the numerous myrtles.

NEW YORK ACADEMY OF SCIENCES.

Sulphur Deposits in Utah and Nevada.*

BY ISRAEL C. RUSSELL.

Sulphur deposits, of sufficient extent to attract attention from their economic importance, have been visited by the writer at three localities in the Great Basin. These are located at Cove Creek, Millard county, Utah; near Humboldt House, Humboldt county, Nevada; and at Rabbit Hole on the eastern edge of the Black Rock desert in north-western Nevada.

Of these deposits the most interesting to the geologist are those occurring at Cove Creek, in Southern Utah, This locality is on the eastern border of the Great Basin, and at the western edge of the region of the high plateaus, recently described by Captain Dutton. Eastward of it is a high range of trachytic mountains that sweep around to the north-west and north-east, forming a crescent-shaped alcove in the western face of the range, the points of which are about ten miles apart. Between the horns of this crescent and three or four miles southwest of the Ranch Fort at Cove Creek, is a conical mountain of basalt, having the ruin of a cinder cove at the summit; for convenience, we shall call this old volcano the Cove Creek crater. From the perfection of its outlines this crater seems so be of a very recent date, but is clothed with a scattered growth of cedars, and judging from its general appearance and the amount of weathering it has sustained, it is probably older than the post-Bonneville craters near Fillmore, Utah. The Cove Creek crater is now in the condition of a nearly extinct fumerole, as hot air and gases are said to escape from cracks and fissures near the summit of the mountain. The area between the base of the crater and the mountains to the eastward of Cove Creek, is occupied by subaerial gravels, excepting along the immediate base of the eastern range, where volcanic tuffs appear at a number of localities. Along the line where the alluvian slopes upwards to meet the tuffs and volcanic rocks, is where the majority of sulphur mines have been opened.

Prospecting for sulphur was begun at Cove Creek about ten years since by Mr. C. A. Semler, and has been carried forward by him with much energy ever since. At the present time fifteen mines have been located, a few of which have been developed to a slight extent, and a large number of prospects opened. The mines, however, have not yet been worked sufficiently to make the sulphur from this locality an article of commerce.

From the hasty examination that I was enabled to make, I find that the sulphur deposits at Cove Creek arrange themselves in three convenient groups, the divisions depending, however, more on the nature of the cavities that have received the sulphur, than on any difference in the manner in which it has been introduced. In one instance the sulphur occupies a nearly extinct solfatara; again we find it impregnating and cementing beds of volcanic tuff; and at other times, the sides of fissures are sheathed with a brilliant drusy lining of sulphur crystals. In all of these instances it is evident that the sulphur has been derived from deeply seated sources, having been expelled in a gaseous form, and condensed and crystallized in the cavities and fissures in the cooler rocks above.

In the mine named the Cleveland by Mr. Semler, situated about two miles southward of the fort at Cove Creek, the sulphur occurs in quantity, filling the crater of a solfatara. The bottom of the little valley in which the Cleveland is situated, is nearly circular, with a diameter of about 1200 feet, and is totally destitute of vegetation. Over the level surface of this strange little desert the sulphur outcrops in many places, forming ledges of sulphur, and a number of prospects show an abundance of quite pure material. A shaft was sunk in the centre of this deposit, to the depth of 25 feet, all in pure sulphur, as I am informed by Mr. Semler. The material taken from this shaft has been returned to it, in order to guard against the burning of the mine, and the broken fragments are now cemented into a solid mass by the sulphur that has been deposited in the interstices between the broken masses. The deposition of sulphur is still in progress, the prospecting holes becoming lined in a few days with most beautiful plumb-like crystals of pure sulphur. The temperature in all the openings in this sulphur bed is high. At the surface of one of the prospecting holes which had been refilled with broken fragments, the thermometer read 104° F., and through all the openings vapour and heated gases are constantly escaping. In cold weather the clouds of vapour forming above this mine may be observed from a distance of a mile or two. The drops of moisture that condense on any cold object held for a moment in the excavations, are intensely acid, and from their taste seem to contain a large proportion of sulphuric acid. No chemical examinations of these acid drops, or of the gases that are constantly escaping from the openings, could be made. It is noticeable, however, that no odour of sulphuretted hydrogen can be detected about the mines, but from a few simple tests, and from the presence of dead animals in a large number of the openings, it seems evident that carbonic acid is exhaled in large quantities.

The sulphur at this locality covers a circular area of about 1000 feet in diameter, and from the prospects that have been reported cannot be less than 25 feet thick. This is not pure sulphur, however, but certainly carries a large percentage of earthy matter. The conclusion arrived at from a hurried inspection of this interesting locality is that the sulphur fills a nearly extinct solfatara, into which it has been conducted from below, seemingly by direct sublimation, or what is perhaps more probable, by the decomposition of sulphurous gases and the deposition of the liberated sulphur. A careful examination of the fumes that are exhaled from these openings would certainly be of much value in determining the chemical history of sulphur deposits.

Of the second class of mines—those in which the sulphur impregnates beds of volcanic tuff—we have examples in the Mariposa and Prince Albert, situated at the base of the mountains, two miles east of the fort at Cove Creek. At these localities the tuff is stratified, and contains scattered pebbles of quartzite and limestone, and is impregnated over a large area with sulphur, which fills all the interstices of the rock. Judging by the eye alone, much of the tuff contains from 10 to 40 per cent. of sulphur, while in localities the work is far richer than this. Overplacing the tuff are alluvial cones of gravel that are in some places cemented by sulphur in the same manner as the strata of tuff beneath, thus showing that the beds now carrying the sulphur have acted simply as condensers for the sulphur, which in every case has been derived from a deeper source.

The third class of sulphur deposits—those in which the

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sulphur forms a lining of crystals on the sides of fissures —are illustrated by the Philadelphia and Mammoth mines. At the first of these, situated one mile north of Cove Creek, the sulphur occurs in drusy crystals, covering the sides of small intersecting fissures in trachyte. The work has here been much broken along a line of faulting, which may be traced northward to the top of the Cove Creek crater. The Mammoth mine is of a similar character, but formed in a dark carboniferous limestone. This mine is located on the top of the divide, between Cove Creek and Dog Valley to the northward. While standing on this pass the line of faulting on which the Mammoth mine is situated may easily be traced southward to the valley of Cove Creek, and across the valley it is again seen as a bold fault scarp, with a throw to the westward ascending the side of the volcanic crater that we have already mentioned several times. The fault crosses this cove just to the east of the summit, and has given the eastern slope of the mountain a steeper inclination than is shown by the western side. Northward from the Mammoth mine the same line of faulting is continued for many miles, and shows a recent scarp all along the eastern border of Dog Valley. The fault scarp that ascends the side of the volcanic cove, and also the recent scarp in Dog Valley are the results of slight and very recent movements along an ancient line of profound displacement. The volcanic mountain south-west of Cove Creek has been built over this old line of fracture. The sulphur in the Mammoth mine has been deposited in the fissures made by the faulting of the strata, and in the seams and openings between the layers of limestone. The rock on the borders of these fissures, beneath the thin lining of sulphur, has been altered to a brown earthy mass to the depth of about half an inch. The mines like the Philadelphia and Mammoth, that have been opened on lines of fracture in solid work, show but little sulphur, and on the whole cannot be considered as giving promise of any large deposit below the surface. In these mines also the temperature is high, but not so great as at the Cleveland.

The beds of volcanic tuff, in which the sulphur has been deposited, probably rest on harder rock that has been fissured, thus allowing the sulphur-bearing vapours to escape upwards, as in the case of the Philadelphia mine, but no section showing the tuff beds above such fissures has been exposed. As these beds of tuff occur for many miles along the base of the mountains, we may hope that the conditions for charging them with sulphur have been many times repeated. Next to the Cleveland mine, we should certainly look to the beds of tuff along the base of the mountains eastward of Cove Creek, for the principal supply of sulphur for economic purposes from this region.

Owing to the exhalation of various gases in nearly all the prospects that have been opened, we find in the bottoms of the excavations large numbers of dead insects, together with the remains of mice, bats, rabbits, etc., that have been smothered by the escaping gases. In many of the openings a choking sensation is felt, and the amount of gas, which seems to be largely carbonic acid, is so great that a person can remain in them but a few seconds; even in shallow prospects the workmen have to fan each other, in order to remain in the openings long enough to do their work. These mines can only be opened from the surface, and even by this method they cannot be worked to any considerable depth, owing to the high temperature of some of the prospects, and the constant escape of noxious gases.

Associated with the deposits of sulphur are beds of gypsum, and also irregular deposits of "alum." Just what the nature of the "alum" may be has not been determined by analysis. These beds usually overlie the sulphur deposits, the alum being sometimes 2 feet thick and the gypsum as much as 8 feet. Hot springs occur in the same field, which, together with the fumerole, at the top of the old crater, bear evidence to the expiring volcanic energy of the region.

Sulphur deposit at Humboldt Station, Nev.—The sulphur at this locality fills nearly vertical fissures, that are directly associated with a very recent basaltic butte that rises in the centre of the Humboldt Valley, near Humboldt Station, on the Central Pacific Railroad. The filling of these fissures with sulphur seems due to the same kind of solfataric action as is still in progress at Cove Creek, but at this locality the fissures are cold and the volcanic action extinct. These deposits of sulphur are of small extent, but a few years since they were opened and worked in a small way. At present they are abandoned, as the discovery of much richer deposits about thirty miles to the northward, on the border of the Black Rock Desert, has rendered their working unprofitable.

The Rabbit Hole Sulphur Mines.—These mines derive their name from the Rabbit Hole Springs, situated a few miles southward of the sulphur deposits, on the eastern border of the Black Rock Desert, in northern Nevada. The hills that rise to the eastward of the principal mines are of stryolite, bordered along their western base by beds of nearly white volcanic tuff or breccia, which is represented on the maps of the Fortieth Parallel Survey as being of Miocene age. These breccias have been greatly altered, and cemented by opal and other silicious infiltrations since their deposition, so that they now form brittle silicious rock with pebbles and fragments of older rocks scattered through the mass. In many places these porous tuffs and breccias are richly charged with sulphur, which fills all the interstices of the rock and sometimes lines large cavities with layers of crystals 5 or 6 feet in thickness. In the Rabbit Hole district sulphur has been found in paying quantities for a distance of several miles along the border of the desert, but the distribution is irregular and uncertain and is always superficial, so far as can be judged by the present openings. As in the Cove Creek mines, the sulphur at Rabbit Hole has been derived from a deeply seated source, and deposited from a vaporous condition in the cooler and higher rocks in which it is now found. Judging from the silicious material that cements the tuffs, it is evident that the porous rocks, in which the sulphur is now found, were penetrated by heated waters bearing silica in solution previous to the deposition of the sulphur. These mines occur in a narrow north and south belt along a line of ancient faulting, which is one of the great structural features of the region. The association of faults with sulphur bearing strata of tuff is here essentially the same as at the Cove Creek mines. At the Rabbit Hole mines, however, no very recent movement of the ancient fault could be determined. This absence of a recent fault scarp, together with the fact that the mines are now cold and do not give off exhalations of gas or vapour, shows that the solfataric action at this locality has long been extinct.

At all the localities visited the sulphur has been derived from sources far beneath the surface from which it has been expelled by heat, and escaped upwards through fissures that were formed along lines of faulting, and has been condensed on the sides of fissures, and in the interspaces of the cooler rocks near the surface. Whether the deposition of the sulphur took place by direct sublimation or by the decomposition of sulphuretted hydrogen, has not been determined. The date at which the sulphur was introduced into the rocks where we now find it, is in all cases very recent, and at the Cove Creek mines is still in progress.

Work at the Rabbit Hole mines is now being carried forward by a day shift of seventeen men, the production of sulphur being about 6 tons per day. The value of the sulphur produced is about forty-five dollars per ton in San Francisco. The sulphur, after being mined and assorted, is placed in upright cast-iron retorts, having a general resemblance to the common form of blast furnace, with a capacity of about 2½ tons. When the retorts are charged the openings at the top, through which the sulphur-bearing rock is introduced, are closed, and superheated steam

admitted at the side. The steam pressure is at first about 70 pounds to the square inch, but as the sulphur begins to melt, the pressure is allowed to subside to 60 or perhaps 50 pounds. When the sulphur melts it passes through a grate, and is collected in a kettle beneath the retort, from which it is allowed to flow in a very liquid brown stream, into a receiving pan, with a capacity of about 12,000 pounds, where impurities that were previously held in suspension are allowed to settle to the bottom. From the receiving pan the sulphur is run into molds, shaped like the frustrum of a cone, each of which has a capacity of from 200 to 250 pounds. When allowed to stand a few days after cooling, those cylindrical masses break into irregular lumps, in which condition it is delivered to the sulphur refinery at San Francisco.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act, 1868.

At the Clerkenwell Police Court, on Friday, the 28th ult., George Theodore Imeson, of 172, Caledonian Road, London, N., was charged with having, on the 20th of July, sold to Mr. Templeman, the Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain, a preparation of opium not labelled with the name of the seller.

Mr. Glaisyer appeared for the prosecution, and Mr. Attenborough, barrister, defended.

The case was under the 17th Section of the Pharmacy Act, 1868, which provides that it shall be unlawful to sell any poison either by wholesale or retail unless the box, bottle, or wrapper in which such poison is contained be distinctly labelled with the name of the article, the word "poison," together with the name and address of the seller of the same. On the 20th ult., Mr. Templeman went to the shop, 172, Caledonian Road, and there purchased from the defendant personally two pennyworth of laudanum. The bottle containing the poison was labelled "Laudanum, Poison. Saunders and Co., Chemists and Dentists, 172, Caledonian Road, London, N., Post and Money Order Office." The defendant was also the postmaster and he was rated as occupier of the premises, but his name does not appear on the Register of Chemists and Druggists, and he has therefore no right to sell poisons.

Mr. Glaisyer then directed the attention of the magistrate to the decision of Mr. Justice Grove and Mr. Justice Lopes, in the case of Templeman *v.* Trafford, who held that the seller within the meaning of the Act was the person who had actual control of the shop where the sale took place.

Mr. Attenborough, in defence, quoted from the case of Templeman *v.* Trafford, which he argued was not at all applicable to the present one, inasmuch as in that case there was no name over the door of the shop, the poison was labelled with the name of a chemist residing at some distance from the shop where the poison was sold. Mr. Imeson, as an unregistered person, might have infringed another section of the statute by selling poisons, but he contended that the requirements of the section under which these proceedings were taken had been complied with, since the name Saunders and Co. appeared on the facie board and also on the bottle, and that enabled them to trace the sale of poisons to that address, the prosecutor had failed to prove that such a firm as Saunders and Co. did not exist.

The Magistrate: We have heard that a Mr. Higham lived at that address, then came the defendant, but there has been no mention of Saunders and Co. residing there. He was clearly of opinion that there had been an infringement of the Act, and the defendant must pay the full penalty of £5 and costs.

Mr. Glaisyer applied for extra costs, which were not allowed.

Obituary.

Notice has been received of the death of the following:—

On the 20th of June, Mr. Charles Wood, Chemist and Druggist, Market Place, Wigan. Aged 37 years.

On the 18th of July, Mr. George Long, Pharmaceutical Chemist, High Street, Peckham, S.E. Aged 52 years.

On the 20th of July, Mr. Joseph Wright, Chemist and Druggist, Bridge Street, Leeds. Aged 49 years.

Correspondence.

The Future of Pharmacy.

Sir,—The question, as it appears to me, is, How is a chemist to get his living, maintain the dignity of his profession, and compete with the numerous stores now in existence, these stores being supplied by the same people that supply us, but on very different terms?

I had given to me the other day, confidentially, a list, which is a piece of ordinary ruled paper, with the articles and prices written on both sides; made out by a very influential wholesale drug house, whose name I must withhold, but the principals of which have been brought before us in a very prominent manner, and I presume it is for the sake of their reputation amongst chemists generally that they withhold their name from the list which is specially made out for stores' orders. Some of the articles I will give you, with prices:—

Dill Water	8 oz. bottles	. 3*s.* 6*d.*	per dozen.
Essence of Ginger . .	1 ,,	. 4*s.*	,,
,, . .	2 ,,	. 7*s.*	,,
Essence of Senna . .	4 ,,	. 6*s.*	,,
,, . .	8 ,,	. 11*s.* 6*d.*	,,
Glycerine, B.P. . .	2 ,,	. 3*s.*	,,
,, . .	4 ,,	. 5*s.* 6*d.*	,,
Vin. Ipecac.	2 ,,	. 3*s.* 9*d.*	,,
,, ...	4 ,,	. 6*s.* 6*d.*	,,
Spirits of Camphor, Nitre and Sal. Volatile	2 ,,	. 6*s.*	,,
,,	4 ,,	. 10*s.* 6*d.*	,,
Com. Conc. Sarsaparilla	4 ,,	. 10*s.*	,,
Cough Linctus . . .	4 ,,	. 4*s.* 6*d.*	,,
,, . . .	8 ,,	. 8*s.*	,,

All less 10 per cent. discount.

Castor oil, 4 oz., 2*s.* 6*d.*; 8 oz., 4*s.* 6*d.*; 10 oz., 5*s.* 6*d.*; 12 oz., 6*s.*; 16 oz., 8*s.*, per dozen.

Cod liver oil, 8 oz., 10*s.* 6*d.*; 16 oz., 18*s.*, per dozen.

These are only a few from a list of sixty-three, and with the ordinary receipts of a chemist and druggist, I think it is impossible for him to compete with these prices. It seems to me, that when we, as a body, find a wholesale house of any description supplying stores, and necessarily giving them the advantage over us, we should, so to speak, "Boycott" that firm. I for one, would not, if I knew it, spend sixpence of my money with any firm that, to my knowledge, supplied stores, and would strongly recommend this plan to the trade generally. From observing the trade advertisements in stores' lists, we should find a great many of those who did supply them. If this plan could be unanimously adopted, wholesale houses would find that a fair and legitimate trade amongst chemists and druggists was far more satisfactory and remunerative than supplying stores at large discounts.

We cannot blame stores, but the people who supply them at special terms and thus giving them the great advantage of offering goods to the public at the same prices as we buy them, or very nearly so, and until we can in some way let those firms find that we will not deal with them, stores will flourish.

Perhaps these few remarks may give rise to some idea that will be beneficial to us in the future of pharmacy.

Wulfruna.

Magister.—You do not appear to be aware that the examination criticized by you was conducted by the College of Preceptors, whose papers you speak of approvingly.

Communications, Letters, etc., have been received from Messrs. W. I. Richardson, Thompson, I. Pike, W. J. McIntosh, J. H. Garrett, Aquam.

HONOURABLE MENTION, International Food Exhibition, Agricultural Hall, London, October, 1880.

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GINGER ALE EXTRACT

SUPPLIES PUNGENCY, AROMA, COLOURING, AND FLAVOURING.

This Extract is strongly recommended for the Manufacture of Ginger Ale, to which it imparts an unusually Fine Flavour and Great Brilliancy, at a cost of a little under 1d. per dozen bottles.

Trade Price, 4s. 6d. per lb.; 12 lbs. and upwards, 4s.

PREPARED BY

W. HAY, Manufacturing Chemist, 4, Regent's Terrace, Hull.

Agents—Messrs. HEARON, SQUIRE & FRANCIS, Wholesale Druggists,
5, COLEMAN STREET, LONDON, E.C.

W. HAY *CAUTIONS THE TRADE* against the use of those spurious so-called SOLUBLE ESSENCES which, besides having NO GINGER AROMA, are FLAVOURLESS, RANK, and DISAGREEABLE, and are little more than TINCTURES OF CAPSICUM.

Hunyadi János

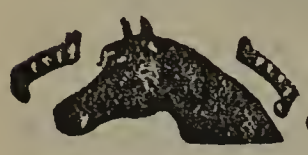
CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

"THE APOLLINARIS COMPANY (LIMITED), LONDON."

HORSES—LIEUT. JAMES'S BLISTER

(Manufactured by R. J. JAMES, the Grandson of the Inventor).

This celebrated Blister is now offered to the Trade at the following reduced prices:—



1 oz. pots from					14/- per doz. to 12/6 per doz.					½ lb. pots from	£4	4	0	per doz. to	£4	0	0
2 ,,	,,	£1	5	6	,,	£1	3	0	,,	1 ,,	,,	7	16	0	,,	7	10	0
4 ,,	,,	2	8	0	,,	2	4	0	,,								

Observe the Trade Mark.—"A Horse's Head on the top of each Pot, and the signature, R. J. James."

Wholesale Agents, BUTLER & CRISPE, 4, Cheapside; NEWBERY, King Edward Street, Newgate Street; MAW, SON & THOMPSON, 11, Aldersgate Street; HUNT & Co., Dublin; GOULDING, Cork; FOGGITT, Thirsk; and SANG & BARKER, Edinburgh. Agents for the Colonies required. Apply, with reference, to R. J. JAMES, 15, Union Bank Buildings, Ely Place, London, E.C.

JAMES v. JAMES.—LORD ROMILLY, the Master of the Rolls, on February 23, 1872, declared "that I had an equal right with other members of the Inventor's family possessing the receipt to make and sell this Blister."—R. J. JAMES.

SAVARESSE'S CAPSULES

of membrane, each containing 15 drops Pure Maranham

COPAIBA BALSAM,

or, also of membrane, each containing 10 drops Purest Yellow

SANDAL WOOD OIL.

The efficacy of these valuable medicines is due to the ABSOLUTE purity of the Balsam or Oil, and to the very GRADUAL solvability of the membrane as compared with gelatine. Box Copaiba (30 caps.) 2s. 6d. Sandal (24 caps.) 4s. 6d. Full Directions.

Sole Manufacturers, EVANS, LESCHER & WEBB, Bartholomew Close, London.

MYOCOM FLY GUM

FOR CATCHING FLIES.

Sold in 1/- boxes by all Chemists and Grocers, or sample can be obtained by post for 1/2. Liberal Trade Terms.

THOS. CHRISTY & CO.

155, FENCHURCH STREET, LONDON.

LITHIA, with Potash or Ammonia.
CITRATE OF POTASH WATER.
POTASH AND SODA, B.P.
MINERAL ACID WATER.
PURE LEMONADE AND GINGER ALE.

Sole Makers of Stevenson's Aërated Lime Water.
The above may be had in Bottles or Syphons.

Orders for 6 dozen carriage free.

HOGG & SON, 1, Southwick Street, Hyde Park, W.

Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xvi.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S

BROKEN-LEAF TEA, 1s. 8d. per lb.

A MONEY SAVING TEA. ABSOLUTELY PURE. The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S

INTERMEDIATE TEA, 2s. per lb.

BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—

AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.

Prospectus and samples free on application.

Warehouses, 154 and 155, Whitechapel Rd., London.

P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

OL. LAVAND. RECT.

Now largely used in perfumery as a substitute for the Mitcham Oil. *Price 21s. per lb. of*

SYMES & CO. LIVERPOOL

London Depôts—8, SNOW HILL, & 1, AUSTRALIAN AVENUE.

ORPE'S COMPOUND PERFUME

½-lb. Bottles, 6/6 each; 1-lb. ditto, 12/6 each.

This compound will be found superior to Bergamot or Lemon for scenting Pomades, Cosmetics, or Oils (¼ oz. to 2 lb. Ol. Olivæ).

A. F. FOSSE (late T. M. Orpe),

329, OLD KENT ROAD, LONDON, S.E.

Importer of French Pomades and Essences. Obtained through Messrs. Maw, Son & Thompson, and all Wholesale Houses.

NATURAL BITTER WATER OF FRIEDRICHSHALL

INGRAM & ROYLE,

119, QUEEN VICTORIA ST., LONDON, E.C. & BATH BRIDGE, BRISTOL.

Price List and Pamphlet on "Natural Mineral Waters : their Properties and Uses," forwarded on application.

FOREIGN

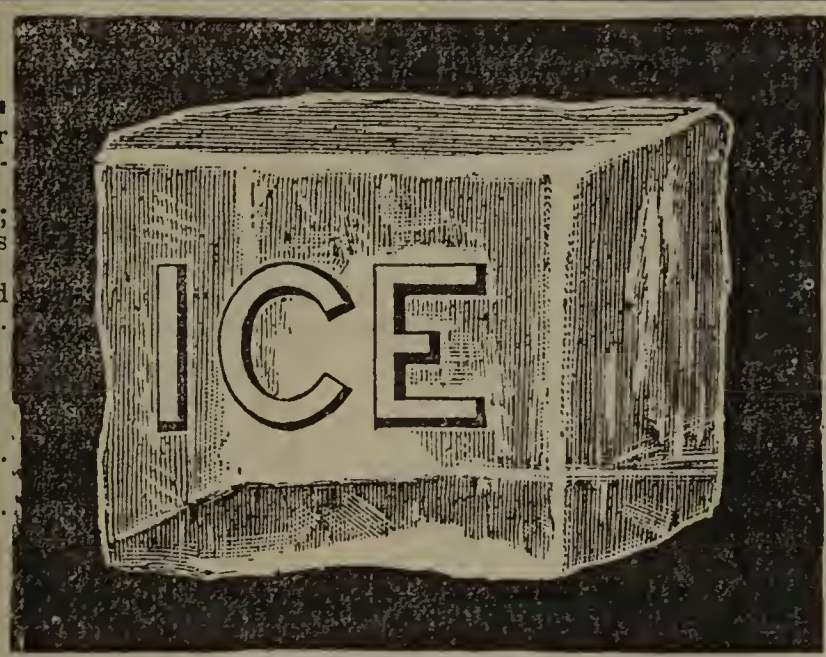
MINERAL WATERS.

FREDERICKSHALL (5 Cases, 6d. per Case less), 24/6 Case, 30 bots.; 34/- Case, 60 ½-bots.

APOLLINARIS, 25/- Case, 50 bots.; 39/- Hpr., 100 ½-bots. Hampers free. 5 °/₀ discount if 20.

HUNYADI JÁNOS (10 Cases, 3/- and 5/- less), 30/- Case, 25 bots.; 50s. Case, 50 ½-bots.

SELTZER ..	11/- Hpr.,	25 bots.	
,, ..	15/- Hpr.,	50 ½-bots.	
PULLNA ..	18/- Case,	20 bots.	
,, ..	30/- Case,	50 ½-bots.	
VICHY ..	31/- ,,	50 bots.	
,, ...	27/- ,,	50 ½-bots.	
CARLSBAD ..	37/- ,,	50 bots.	
KISSENGEN ..	42/6 ,,	50 ,,	
SCHWALLBACH	27/6 ,,	50 ,,	
HOMBURG ..	37/6 ,,	50 ,,	
WILDUNGEN	40/- ,,	50 ,,	



CARLSBAD SALTS, ¼-bots., 20/- per doz.; ½-bots., 40/- per doz.; bots., 80/- per doz.

NORWAY

BLOCK ICE.

Packing & Mats for Original Blocks free; 3d. each allowed for Mats if returned.

Low quotations given for quantities taken from vessels while discharging.

PRINTED DIRECTIONS for STORING ICE sent free on application.

W. B. HARRISON,

IMPORTER of ICE and MINERAL WATERS,

6, Bridge St. Sunderland.

Spiritus Ætheris Nitrosi

Guaranteed to contain the proportion of Nitrous Ether directed by the British Pharmacopœia.

Æther Nitrosus and Sol. Ætheris Nitrosi

Respectively 8 and 4 times the strength of the Spirit.

Spirit. Ammoniæ Aromaticus

Distilled from Volcanic Ammonia.

JAMES WOOLLEY, SONS & CO.

Manufacturing Pharmaceutical Chemists, MANCHESTER.

30/- Gross for 6d. Plain

60/- Gross for 1/- Plain

36/- Gross for 6d. Pedestals

72/- Gross for 1/- Pedestals

MY WHOLESALE TRADE TERMS ARE:—

Be pleased to order the "Daughter Crystal Palace Brand." Frequent complaints of others being substituted.

GIVEN AWAY

With every HALF DOZEN of

BOND'S CRYSTAL PALACE

| Great Sale | GOLD MEDAL | where Shown. |

MARKING INK

(Prepared by the Daughter of the late John Bond),

A Handsome GOLD Show Card or Transparent Lid Box.

Order at once on the New Show Card, which is portable, and so constructed that it can be either suspended in the Window or used as a Counter Card. Quite a Novelty.

CAUTION TO WHOLESALE & RETAIL VENDORS.

Costs and Damages awarded in actions tried December, 1875, and November, 1877, for selling and manufacturing Colourable Imitations. To secure the genuine article please order of your Wholesale House, "BOND'S (Daughter of the late John) CRYSTAL PALACE MARKING INK." In consequence of daily complaints of other Inks being substituted, kindly furnish every particular to the Proprietor; legal proceedings will then be taken. ADVERTISED ALL OVER THE WORLD.

CHRISTY'S WHITE PAPAÏNE

FOR

Eczema, Psoriasis, Corns, Warts, Diphtheria, &c., &c.

Mr. MALCOLM MORRIS, in *British Medical Journal*, May 20, 1882, p.738, relating his experience with Papaw in Chronic Eczema, says:—"I have had such marked success with it that I recommend it to the profession as a remedy worthy of trial in cases which often resist all the ordinary modes of treatment. . . . In some other cases of chronic eczema and psoriasis the same benefit has followed in as short a time as in the case above mentioned."

In the same Journal, on June 3, 1882, p. 845, he further states:—"I am now using the drug with considerable benefit in a case of severe warts. I find it also of use in softening hard corns."

We have just received a fresh supply of this drug, which will be found the cheapest and most efficient.

When ordering, specify "CHRISTY'S WHITE."

THOS. CHRISTY & CO., 155, FENCHURCH STREET,

LONDON, E.C.

REGISTERED.

PURE AËRATED WATERS

Ellis's Ruthin Waters,

CRYSTAL SPRINGS.

Soda, Potass, Seltzer, Lemonade, Lithia, and for GOUT, Lithia and Potass.

CORKS BRANDED "R. ELLIS & SON, RUTHIN," and every label bears their trade mark. Sold everywhere, and Wholesale of R. ELLIS & SON, Ruthin, North Wales. London Agents: W. BEST & SONS, Henrietta St., Cavendish Sq.

VINAIGRE DE BORDEAUX.

W. & S. KENT & SONS,

Importers for more than forty years of finest French Wine Vinegar, Old and Well Matured, offer it in Hogsheads and Tierçons. Terms and Samples on application.

UPTON-ON-SEVERN.

N.B.—Pure Flavourless Sp. Vini.

GOLD MEDAL, ADELAIDE, 1881.

ESTABLISHED 1824

TRADE MARK — *NEEDHAM'S* — TRADE MARK

POLISHING PASTE

AFTER BEING IN USE FOR OVER 50 YEARS IS ACKNOWLEDGED TO BE THE BEST CLEANER AND POLISHER OF BRASS COPPER BRITANNIA METAL, &c. &c. ALSO

PICKERING'S

FURNITURE POLISH

PLATE POWDER &c.

SHEFFIELD

Joseph Pickering & Sons, Albyn Works, Sheffield.

GREAT SAVING IN THE PURCHASE

of the best New Dispensing Bottles and Phials by taking not less than 6 gross of assorted sizes, at

I. ISAACS & CO., Glass Bottle Manufacturers,

Office and Warehouse, 25, Francis Street, Tottenham Court Road, London. *Established upwards of 70 years.*

			per gross.
3 and 4 oz., clear blue tinted, plain or graduated ...		...	7s. 6d.
6 and 8 oz.	do.	do.	8s. 6d.
½ oz., and under, white moulded phials		Plain or graduated to teaspoons.	4s. 0d.
1 oz.	do.		4s. 6d.
1½ oz.	do.	Long or short series.	5s. 0d.
2 oz.	do.		6s. 0d.

Name and Address can be had on the flat shape bottles, without any extra charge whatever. Country packages 1s. each. P. O. Orders to be made payable at Tottenham Court Road. Cheques crossed London and Westminster Bank.

IMPORTANT!

TO THE TRADE AND OTHERS.

P. C. YOUNG (late JOHN PROCKTER), Chemist, 16, Market Pl., Penzance, begs to intimate that having purchased the whole of the valuable recipes used by the late firm of Messrs. PROCKTER & BUCKETT, of Penzance, he is now the *Sole Maker and Proprietor* of the following well-known preparations:—

PROCKTER'S Parisian Essence.
" Essence of Rennet.
" Cornubian Vegetable Cream.
" Columbian Oil.
" Chlorodyne Cough Mixture.
" Lavender Water.
Dr. GIBBS'S Digestive or Dinner Pills.

Also many other Proprietary Articles, for which the late Mr. PROCKTER was so justly celebrated.

JETTINE,

The only preparation which does not injure the leather.

Produces a perfectly black and permanent gloss, which will not rub off even when wetted, nor soil the most delicate article of dress.

It is invaluable for Ladies' and Children's Boots and Shoes, Waist Belts, Travelling Bags, &c. Each bottle is neatly packed in a cardboard box, and contains a sponge mounted and ready for use: thus JETTINE may be applied without soiling the hands.

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Barclay & Sons, 95, Farringdon St., E.C.
Edwards & Son, 157, Qn. Victoria St., E.C.
Evans, Lescher & Webb, 60, Bartholomew Close, E.C.
Hovenden & Sons, 5, Gt. Marlboro' St., W.
Lynch & Co., 171A, Aldersgate St., E.C.
Maw, Son & Thompson, Aldersgate St., E.C.
May, Roberts & Co., Cowcross St., E.C.
Sanger & Sons, 150, Oxford St., W., or of
E. Penton & Son, 1 and 3, Mortimer St., W.

St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

MINOR & PRELIMINARY.

TULLY'S Postal System is the most successful method of preparing without leaving business. Fee—MINOR, One Guinea. PRELIMINARY, 10s. 6d. Send stamped envelope for particulars and *original Testimonials* (*not Copies*) to Mr. J. TULLY (Hills Prizeman), Chemist, Tunbridge Wells. Established 1872.

The London Hospital and Medical COLLEGE.

HOSPITAL STAFF.

Consulting Physicians—Dr. Herbert Davies, Dr. Ramskill.
Consulting Surgeon—Mr. Curling, F.R.S.
Physicians—Dr. Andrew Clark, Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom.
Assistant-Physicians—Dr. Charlewood Turner, Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Hutchinson, F.R.S., Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Fredk. Treves, Mr. C. Mansell Moullin.
Obstetric Physician—Dr. Palfrey.
Assistant Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. James Adams, Mr. Waren Tay.
Aural Surgeons—Dr. Edw. Woakes and Mr. T. Mark Hovell.
Surgeon-Dentist—Mr. Ashley W. Barrett.

LECTURERS.

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Jas. Adams.
Operative Surgery—Mr. Jas. Adams.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Rivington.
Practical Anatomy—Mr. Fredk. Treves.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Midwifery—Dr. Palfrey.
Toxicology—
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. C. Meymott Tidy.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy & Pathology of the Teeth—Mr. Ashley W. Barrett.

The SESSION 1882—1883 will commence on Monday, October 2nd, 1882, when an Introductory address will be delivered, to be followed by a Conversazione, to which all past and present Students are invited.

Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of In-patients during 1881 was 6,840, Out-patients 58,307.

THE RESIDENT AND OTHER HOSPITAL APPOINTMENTS are free to full Students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, and one Accoucheurship; also two Dresserships and two Maternity Assistantships.

TWO ENTRANCE SCIENCE SCHOLARSHIPS, value £60 and £40, and TWO BUXTON SCHOLARSHIPS, value £30 and £20, will be offered for competition at the end of September to new Students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first year's Students.

A Scholarship, value £25, in Anatomy, Physiology, and Chemistry, to second year's Students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

Prizes, value £60, to Dressers of Out-patients in Minor Surgery.

Special entries for Medical and Surgical Practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis.

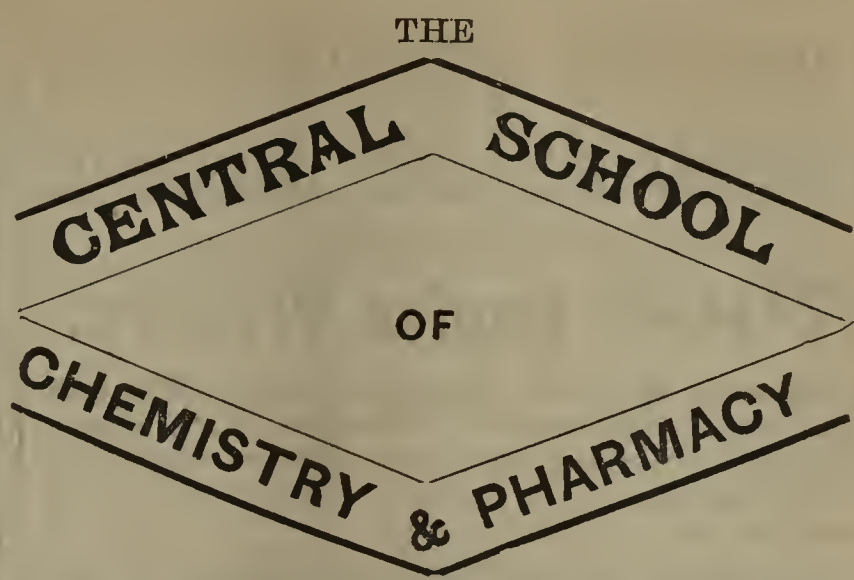
For prospectus and particulars, apply personally, or by letter, to Mile-end, E. MUNRO SCOTT, Warden.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.



At the Examinations held in June the following Students of this School were successful.

MAJOR.

*Mr. W. A. SHEPHARD.

MINOR.

*Mr. W. H. DANGERFIELD.
* ,, J. T. HALL.
*Mr. T. W. LOWTHER.
* ,, E. WILKINS.

At the July Examinations the following Minor Students from this School were successful.

Mr. S. ALLEN.
* ,, W. EVANS.
* ,, A. HALL.
* ,, C. HANSON.
* ,, T. S. HODGSON.
,, W. M. JACKSON.
*Mr. J. MEADOWS.
,, W. PEARSON.
* ,, W. H. THOMAS.
* ,, H. H. TOWNSEND.
* ,, J. R. WOOD.
* ,, W. J. WILLIAMS.

* These Students passed the first time of presentation.

The next Session will commence on September 1st.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS, A.P.S., G.S.T., &c.

130, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE EARLY IN SEPTEMBER

EIGHT of my Students presented themselves at the JULY Minor, **SIX** passed. Three others received their finishing instruction from me, but being at other schools at the time of passing are not included in the above total. **TWO** out of **FOUR** of my pupils passed at the JUNE meeting.

A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER candidates. Enclose stamp for particulars.

Laboratory close to Gower Street Station.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

TERMS FOR ADVERTISEMENTS

IN THE

PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION

7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, as also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6d. Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received,* but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order,** or by **P. O. Order,** payable at Regent Street, W., to J. & A. Churchill.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes **"PHARM JOURN,"** and must be sent only to the Publishers,

J. & A. Churchill, 11, New Burlington St., London, W.

ENGAGEMENTS WANTED.

As Junior. Age 23. Height 5ft. 10in. Good references given. 2 years at last situation. Disengaged Aug. 16. S. C. McKee, Messrs. Izod & Co., Gipsy Hill, Upper Norwood, S.E.

A QUALIFIED Chemist, having lately disposed of his business, is willing to act as Manager or Locum Tenens. Excellent references. Terms, 6s. per day, 35s. per week. Chemicus, Auction Offices, Vicarage St., Frome.

As Assistant or Manager. Thorough practical experience in London first-class business. Well up in English and French pharmacy. Excellent references. Alpha, Lloyd & Co., 75, Fleet St.

IMMEDIATELY.—Re-engagement as Assistant in Dispensing and Prescribing, in London. Out-door or in. Age 28. L. A., 27, Fleming Rd., Lorrimore Sq., Walworth, S.E.

As Temporary Manager or Assistant, or to get up stock, by the day or otherwise. Thorough experience. Age 30. Now disengaged. Chemicus, 3, Norfolk Ter., Shakspeare Rd., Loughborough Junction, S.W.

IMMEDIATELY.—In Surgeon's Retail, by a young gentleman, accustomed to Prescribe, Extract Teeth and Dispense. Salary moderate. Good reference. Dentitio, 1, Malvern Rd., Hornsey Park, Hornsey.

ENGAGEMENTS WANTED.

As Junior in Mixed business. 7½ years' experience. Age 23. Wishes to engage with a Dissenter. State salary and hours. X., 10, Mill St., Padiham, Lancs.

LOCUM Tenens. By a gentleman (Pharm. Chemist) of good address and long experience, to take charge during absence. Disengaged after the 21st. Medicus, 3, Blomfield Ter., Royal Oak, W.

As Junior. 5 years' good experience. Age 20. Height 5ft. 10in. For particulars, W. E. Pritchett, Pallance, West Cowes, I. of W.

As Assistant, or Dispenser to Surgeon. North-west preferred. Age 21. Height 5ft. 6in. W. H., 22, Church St., Old Basford, Nottingham.

YOUNG Man, 22, desires out-door permanency as Assistant to Chemist or Dispenser to Surgeon. 5 years' experience. E. W. E., 33, Ella St., Harpurhey, Manchester.

As Junior. Age 21. Height 5ft. 11in. 4½ years' experience. Alpha, 26, Westgate St., Ipswich.

As Assistant. Town or seaside preferred. Age 22. 6 years' experience. Highest references. Minor qualification. Now disengaged. W. G. Wells, 36, Weely St., Maidstone.

As Manager or Temporary. First-class West-end experience. Registered. Good references. Please state particulars if permanent. Chemicus, 148, Hornsey Rd., Holloway, N.

As Manager, temporary, or with view to partnership or succession. A. H., Duchess Farm, St. Osyth, Colchester.

As Junior. 4½ years' experience. Age 20. Height 5ft. 6in. Excellent references as to personal character and experience. G., 31, Russell St., Landport.

As Assistant in good house of business. Age 28. Minor qualification. Good references. Town or country. In or out-door. Julian, 27, Leighton Grove, N.W.

As Junior in a good-class Dispensing and Retail business. Age 22. Passed Preliminary. Good references. Disengaged shortly. Can Extract Teeth. Epsilon, Mr. H. Livell, 35, Park St., Devizes.

As Junior or Improver in a good Dispensing and Retail. 4 years' experience. Ætat 19. Height 5ft. 4in. Good references. Small salary. Junior, Bridge St., South Stockton.

IN-DOORS, in London. As Junior. Age 21. Height 5ft. 7in. Nearly 5½ years' experience in good-class business. Good references. A. Aston, The Terrace, Tarporley.

TO Manage a Business, or out-door Assistant. Age 30. Married. Registered. Town and country experience. Good references. Permanency desired. W. R. B., 204, Mare St., Hackney.

MANAGER of Branch, Dispenser, or out-door Assistant. Wholesale or Retail. An experienced man. Good testimonials and references. Town or suburbs. Disengaged 25th. W., 22, Great Portland St., W.

As Assistant in a good Dispensing business. Age 24. Height 5ft. 9in. Good reference. J. M. Weller, Mr. Smithson's, Chemist, 1, Preston Rd., Brighton.

As Junior. 3 years' experience. Age 19½. Height 5ft. 10in. London or suburbs preferred. W. W., 15, Broad Green, Croydon.

JUNIOR. Age 19. Height 5ft. 6in. 5 years' experience. Disengaged 11th September. Chas. E. Dodsley, Mr. Lugar's, 75, Osmaston Rd., Derby.

TEMPORARY Assistant or Manager. A Registered Chemist is open to engagements by the day or week. 30 years' town and country experience. Locum Tenens, 4, Manor Villas, Goodrich Rd., East Dulwich, S.E.

ASSISTANTS WANTED.

AT once.—A steady and active CLERK in a Wholesale Drug Warehouse. He must be a good penman, acquainted with the trade, and be able to furnish satisfactory references. Apply, LOFTHOUSE & SALTMER, Wholesale Druggists, Hull.

A JUNIOR ASSISTANT, for 5 months, who will accept time for study in lieu of salary. CARLTON, Peterborough.

OUT-DOOR. Experienced ASSISTANT for Mixed country trade. One accustomed to travel occasionally. Hours 8 to 7, Saturdays 10. No Sunday duty. State age, salary, and full particulars, with photo. and reference. Apply to F. HOLE, Market Pl., Mansfield, Notts.

A JUNIOR ASSISTANT for a Dispensing and light Retail business. Apply, stating age, height, salary required, reference, when disengaged, &c., to F. SUSSUM, 6, Market Pl., Cambridge. Photo. to be enclosed if possible.

A RESIDENT DISPENSER for an Institution near London. He should write a good hand, as he will be required to fill up his time with bookkeeping or correspondence. Salary £40, with board, lodging and washing. Address, COLLIN, Messrs. Deacon's Advertisement Offices, 154, Leadenhall St., E.C.

AN ASSISTANT. Accustomed to a good-class Family and Dispensing business. Apply, stating age, height, and salary required, &c., to J. P. PROVOST, Pharmaceutical Chemist, Huntingdon.

BRUSSELS.—An ASSISTANT. Accustomed to first-class business, and speaking French preferred. Address, with full particulars and references, PHARMACIE ANGLAISE, Brussels.

THE General Infirmary at Gloucester and the Gloucestershire Eye Institution.—A non-resident DISPENSER. Should possess the Minor qualification. Applications, stating salary required, with testimonials, to be forwarded to the Committee on or before Wednesday, August 23rd.

APPRENTICE. Immediately. In a first-class Retail and Dispensing business, in the West-end, a well educated youth as an APPRENTICE. 5 others employed. A good premium required. A. B., care of Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

AT the end of the month.—An ASSISTANT, about 23. Quick and reliable as a Dispenser. Must be well recommended. Particulars to F. ROSSITER, 20, George St., Hastings.

A THOROUGHLY competent ASSISTANT. Address, stating age, salary required, and enclosing references, H., 8, Grange Cres., Sunderland.

AT once.—An active JUNIOR, age about 21, for a West-end house. Apply personally, between 12 and 7 p.m., at 65, Charing Cross (near Spring Gardens).

BY August 21st.—A Junior ASSISTANT not, under 21 Must be a good Dispenser. State height, salary, and full particulars, to JAS. E. PINCH, Cheap St., Bath.

JUNIOR ASSISTANT or good IMPROVER. Time for study. Salary moderate. State age, &c., to R. S., 37, Vestry Rd., Peckham Rd., S.E.

BALA, North Wales.—A trustworthy ASSISTANT (Welshman) in a Mixed country trade. Apply, with carte, stating age, salary required, &c., to THOMAS JONES, Chemist & Ironmonger.

A JUNIOR. Out-door. Early in September. Must be of good address and with satisfactory references. State full particulars of experience, with salary required, enclosing carte, to J. WHITFIELD, Pharmacist, Scarbro'.

A JUNIOR ASSISTANT in a light general trade. Must be a good Dispenser. Apply to Mr. THOMAS LOVEITT, Broad Gate, Coventry.

ASSISTANTS WANTED.

F. M. RIMMINGTON & SON, Bradford, Yorks, have a vacancy for an out-door ASSISTANT, about 22. He must have been accustomed to a genteel business, and competent to Dispense and keep accounts. A good general knowledge is requisite, also good references.

AS Second ASSISTANT. In-doors. Must be an experienced Dispenser, and accustomed to first-class Retail. Apply personally, or if by letter, enclose carte and state full particulars as to experience, age, height, and salary required, to EDWARD C. PERKS, 1, Sloane Sq., London, S.W.

IMMEDIATELY.—An out-door ASSISTANT for a first-class Dispensing business. State last reference and usual particulars to Mr. FIELD, Chemist, Brighton.

IN a fortnight.—An ASSISTANT, thoroughly reliable, of good character, and able to Dispense. For about 3 months, during the temporary absence of the present assistant. Pleasant locality (S. Devon). Apply by letter only, CHEMIST, W. G. Swiss, Printer, Tavistock St., Devonport.

EARLY in September. — A thoroughly competent energetic ASSISTANT, for a West-end house, with Minor qualification, and accustomed to a first-class Dispensing business. Age not under 25. Apply personally, between 12 and 7 p.m., at 65, Charing Cross (near Spring Gardens).

BY a firm of Wholesale Druggists, a young man as CLERK. One brought up to the business, and who has had some experience in counting house work. Apply by letter to A., care of Optician, 11, Crooked Lane, London Bridge.

PARENTS and Guardians.—G. D. HORTON, M.P.S., Dispensing Chemist (from the Birmingham General Hospital), has a vacancy for a respectable youth as an APPRENTICE. Time allowed for study and lectures. Comfortable home. References exchanged. Premium required. Established 1860. Address, Aston House, corner of Sutton St., Aston Rd., Birmingham.

OUT-DOOR.—A thoroughly experienced, competent, and energetic ASSISTANT, of good appearance and address, not under 30 years of age, to take the active Management of a good-class Family Retail and Dispensing business. To a suitable person a liberal salary will be given. Applications, with full particulars of age, height, and salary required, to be addressed CHEMICUS, Messrs. Herrings & Co., 40, Aldersgate St., London.

SENIOR ASSISTANT (out-door), in a leading town in the north of England. Address, with particulars, references, and stating salary required, F. C. S., care of Mr. Richard Bremridge, 17, Bloomsbury Sq., W.C.

IMMEDIATELY.—A competent, trustworthy ASSISTANT (out-door), of good address, age from 21 to 24, for a Mixed country business. Good references indispensable. Apply, stating age, height, salary, enclosing carte (to be returned), to FRANCIS CLATER, Pharmaceutical Chemist, The Square, Retford.

AN experienced ASSISTANT, of active business habits. Must be a competent Dispenser. State salary, experience, and references, to RASTRICK & SON, King's Rd., Southsea.

GOOD JUNIOR, for country Retail business. One who is obliging, steady, and possessing the Minor qualification preferred. Apply, with full detail, or personally, to CAMPION, Chemist, Harlow, Essex.

A WELL educated youth as an APPRENTICE, or an IMPROVER. No premium. Apply to F. J. STANNARD, Post Office, Broad Green, Croydon.

A COMPETENT ASSISTANT, about 25 years of age, who has been accustomed to a good-class Dispensing and light Retail business. Salary liberal and progressive. Full particulars to H. JEFFERY, Chemist, Bristol.

ASSISTANTS WANTED.

ASSISTANT, for Demerara. Must be a good Dispenser and of unimpeachable character. Apply by letter only, stating age, qualifications, &c., to K. J., care of Davy, Yates & Routledge, 64, Park St., Southwark, London, S.E.

MESSRS. FOSTER & ELSE, Brighton, have a vacancy for a Junior ASSISTANT. State age, references, and salary required, also enclosing carte.

A COMPETENT ASSISTANT for good-class Retail and Dispensing. Particulars and references to A. B., 54, High St., Stroud.

A GOOD MINOR, used to a Mixed business. Must have first-rate references of ability, honesty, steadiness, and obliging manners. State salary, out. Send photograph and height. R. H. MAYS & SON, 3, Market Pl., South Shields.

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SNUG Country BUSINESS, near Stockport. No opposition for 2 miles. Excellent opportunity for young man or branch business. Best prices obtained. Will do £400 with care. Stock and fixtures at valuation House attached. Very low rental. Improving healthy locality. Principally light Retail and Prescribing. A. GREAVES & SON, Chesterfield.

SUBURBS.—Very profitable light-class RETAIL, established 15 months and making net profit £4 weekly, after all deductions. Will do double in 12 months. Excellent modern house. Low rent. Good fittings and stock. Price £300. Mr. YOUNG, 114, Victoria St., Westminster, S.W.

CHEMIST'S BUSINESS. Handsome shop, nearly new, well fitted and stocked. Has steadily increased from £4 to £8 weekly under management in 10 months. Stands well in a densely populated middle-class neighbourhood. East of London. Light and profitable trade. A good opening to combine Dentistry. 21 years' lease at £45. Good 10-roomed house. Bulk of rent could be let off if desired. Cash £400. No agents. Apply, GARMAN BROTHERS, Wholesale Druggists, 278, Roman Rd., Bow, E.

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MR. HINE GILBERT has for sale a high-class Dispensing BUSINESS. Returning £800 per annum. Situated in the most popular seaside resort; now in the height of the season. Sea view. Commodious residence. Price £525. An undoubted bargain, and only requires seeing. Cards obtainable at 17, Hart St., Bloomsbury.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—N. OF ENGLAND. Genuine Retail and Dispensing Trade. Returning £1100 (proof). Excellent residence. Well fitted and stocked. For £900. Only requires seeing. KENT. Most delightfully situated. Elegantly fitted high-class Dispensing Trade. Returning £700 by assistant; principal did £900. Price £600. THAMES VALLEY. Well fitted and stocked. Taking £10 weekly. £400, and part remain. LANCS. (Death vacancy.) Dispensing and Retail. Nothing heavy. Returns average £2000. Books and trade invoices to prove the trade. £1500. Part remain. ESSEX. Guaranteed income of £300 net. For £400. LONDON, N. £60. Well secured Retail. Doing £7 weekly. Balance £80, by instalments. CRYSTAL PALACE (near). Handsomely fitted Retail. Greatly neglected. £75. Fittings worth £120. Apply, 30, Jewry St., Aldgate, City.

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£400.—Genuine Retail and DISPENSING. Only 2 chemists, with 16,000 inhabitants. Rent £36. 9 rooms and large shop. Lease 20 years. No dentist in the neighbourhood. Full prices. CONFIDENTIAL, Newbery & Son, 1, King Edward St., E.C.

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WELL situated in a thriving suburb of London, a profitable Retail and Dispensing BUSINESS. Price £450. Apply, by letter, to M. A., 125, Malden Rd., N.W.

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YORKS.—Retail, Dispensing, and PRESCRIBING. Excellent shop and residence. Good-class town. Returns £1600. Price at valuation—£1000.

WALES, SOUTH.—Sea-side resort. Unopposed Family TRADE, with Wines and Spirits. Returns £850. At valuation—about £500.

ESSEX.—Death vacancy. Unopposed Dispensing and Light RETAIL, in very pretty district. All full prices. Returns £600. Rent nominal. Price £550.

MIDLANDS.—Good General TRADE, with Dispensing, &c. Very profitable. Returns £1000. Bonâ fide reason for sale. Price £750.

LONDON (SUBURB), E.—Dispensing and Family RETAIL. Returns £550. Post Office more than pays rent. Good house, garden, &c. Very desirable concern. Long lease. Price £500.

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Have NOW READY their NEW PRINTED REGISTER, which contains particulars of about 200 businesses in town and country, ranging in price from £80 to £2500, and will be forwarded post free on application.

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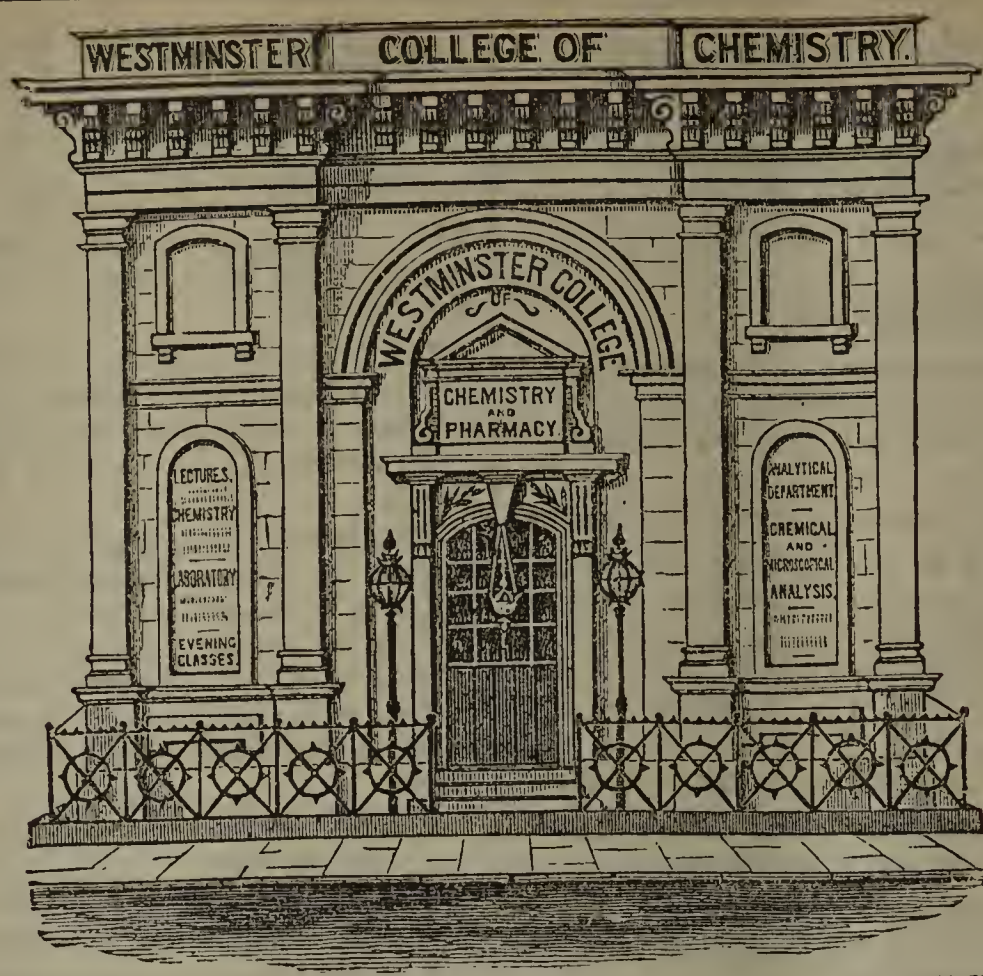
Until Qualified ...£5 5s.

MINOR or MAJOR

One Month ..... £3 3s.
October Exam.... £4 4s.
Three Months ... £7 7s.
December Exam. £8 8s.
Until Qualified £10 10s.

MINOR AND MAJOR
£15 15s.



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Director . . . . G. S. V. WILLS, F.L.S., F.R.M.S.

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The Pharmaceutical portion of the Instruction in this College is equal to that of any other School.

The success which always attends Students presenting themselves from this School furnishes a sufficient test of the thoroughness of the education imparted. The subjoined pass list* speaks for itself, and is a surer proof than flattering advertisements of the success of the Students of the Westminster College and the excellence of the instruction thereat imparted.

*PASS-LIST FOR THE SESSION 1881-82.

26 Students entered this School for the MAJOR COURSE. 18 presented themselves for examination. The following 10 passed :— Messrs. Harrison, Humphries, Bush, Chabôt, Hollingsworth, Harrop, Horrell, Holmes, F., Murray, and Wheatley. As an example of the unparalleled success attending the Westminster College Students in the Minor Examination we tabulate the result of each examination.

October.		December.		February.		April.		June.	July.	
FROM West. Col.	FROM Other Sources.	FROM West. Col.	FROM Other Sources.	FROM West. Col.	FROM Other Sources.	FROM West. Col.	FROM Other Sources.	FROM West. Col.	FROM West. Col.	FROM Other Sources.
Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.	Messrs.
Baxter	Atkinson	Adler	Brooks	Benson	Bright	Ball	Ball	Arkle	Bowering	Allen
Bayley	Brooker	Bearpark	Brown	Butterworth	Damant	Davies	Birkbeck	Coates	Cave	Dilton
Buckley	Buck	Coslett	Caldecott	Dearnley	Dowty	Dutton	Blewett	Coombs	Comer	Evans
Budden	Chipchase	Crossley	Chesterfield	Dunn	Elston	Eddy	Brunton	Elton	Cullwick	Greenall
Burchell	Cleland	Cutts	Dampney	Evans	Fotheringham	Emerson	Burton	Hill	Daniel	Hall
Caton	Davies	Evans	Dix	Freeman	Foulston	Farthing	Clare	Humphries	Eley	Hanson
Chubb	Davies	Evans	Dolbear	Hadfield	Gilbert	Graham	Davis	Ricketts	Evans	Harston
Cox	Day	Forth	Duckett	Healy	Haward	Littleboy	Drew	Spencer	Foggitt	Hodgson
Elliott	Eccles	Hart	Fisher	Oldfield	Jones	Longstaff	Ellis	Thompson	Frost	Hornby
Graves	Foden	Heale	Jackson	Orange	Lockwood	Odhams	Field	9	Gaskin	Meadows
Harrison	Fry	Hickes	Johnson	Ray	Marshall	Pitts	Forster		Hankinson	Miller
Harrop	Hetherington	Hodgson	Jones	Robinson	Mason	Quibell	Glew		Hewlett	Miss Mitten
Holliday	Hill	Hopkinson	Levett	Silvers	Matterson	Radford	Hayward		Hickson	Pearson
Hollingworth	Leach	Machin	Lloyd	Stephenson	Richards	Radcliffe	Heald		Innes	Ransom
Holmes	Lissaman	Mainprize	Rouw		Short	Randall	Herbert		Loam	Thisleton
Hughes	McDermott	Mitchell	Shields		Smith	Shackleton	Job		Longtoft	Thomas
Jones	Maitland	Nathan	Simpson		Stephenson	Summers	Jones		Mann	Townsend
Kelly	Milford	Purvis	Smith		Wakelin	Swadling	Legg		Nichol	Tyson
Kennerley	Mitchell	Rees	Steel		Wigg	Walker	Oldershaw		Noble	Waymouth
Layng	Parker	Shuffrey	Tozer			Whitney	Reade		Norburn	Wheeley
Newbould	Pars	Smith, L.	Ward, J.			Williams	Roberts		Northen	Williams
Penberthy	Pegg	Stennett	Ward, W.			Wilson	Roberts		Parker	Wood
Phillips	Roberts	Taylor	West			Wood	Savage	FROM Other Sources.	Pellew	Thomas, J. A.
Swift	Sanderson	Trickey	White				Stephens	Messrs.	Pickering	
Taylor	Saunders	Webb	Wilson				Smith	Bird	Pinder	
Thomas	Shephard	Loxton	Wood				Taylor	Dangerfield	Rodnell	
Thomas	Silk	Jones, R.					Taylor	Darch	Rowland	
Thompson	Thomson	Smith, J.					Tucker	Hall	Sergent	
Towle	Turney						Turnell	Lowther	Shapcott	
Trounson	Water						Wilde	.....	Thomas	
Waterworth	Warman						Winter	Wilcock	Warburton	
Watson	Watts						Woollons	Mrs. Mills	Weddle	
Weavers	Wingrave						Wright.		Wellburn	
Wheatley	Worsley								Wells	
Wilcock	Wyatt								Worts	
35	35	28	26	14	19	23	33	8	35	23

N.B.—From the above statement it will be seen that 144 passed the Minor Examination in London from the Westminster College, while only 144 passed from all other Sources.

For Prospectus and further Particulars, apply personally, or by letter, to Messrs. WILLS & WOOTTON, Westminster College, Trinity Square, LONDON, S.E.

London: Printed by Stevens & Richardson, 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill, 11, New Burlington Street.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the [illegible] ber of the receipt for his declaration and his [illegible] time of giving notice.

Candidates will receive notice of the date [illegible] they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

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CATALOGUE OF THE MUSEUM.

The Catalogue of the Museum may be obtained from the Secretary, price 2s.; or by post, 2s. 4d. Each Member and Associate in business will be supplied with one copy *gratis*, on application to the Secretary.

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The Society's Rooms will be closed from August 12th to September 11th.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Friday, October 6th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, will commence on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to the day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

NOTICE TO ADVERTISERS.

The **PHARMACEUTICAL JOURNAL** of August 26 will contain

A GENERAL REPORT OF THE PROCEEDINGS OF THE

British Pharmaceutical Conference,

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All Communications should be addressed to the Publishers,

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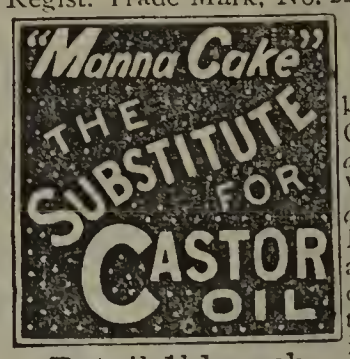

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The plaintiff, however, proved that this was in fact the same, and the court granted the injunction. The defendant also threatened to publish the recipe unless it were bought up by the plaintiff.

His lordship made an order that in default of defendant paying the costs, he should stand committed to prison.

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THE INTERNATIONAL ELECTRIC EXHIBITION.

(*Continued from page* 102.)

The next Englishman to tread in Mr. Swan's steps in this field was Mr. St. George Lane-Fox. The following description of this inventor's lamp by the Paris Committee is very full and clear, but further details as to the manner in which the contacts are made will be found of interest and will therefore be given after the description. "The Lane-Fox lamp is ovoid in shape, the neck being in length intermediate between the two lamps last described (Swan and Maxim). The carbon is in the form of a horseshoe, and is circular in cross-section. It is made from the root of an Italian grass, largely used in France for making brooms. After carbonization the filaments are classified according to their resistances. They are then heated in an atmosphere of coal gas, by which carbon is deposited upon them, as in the filaments of the lamps last described. The filament in the lamp is supported by platinum wires, to which it is attached by sleeves of carbon encircling both. These wires pass through tubes in the top of a hollow glass stem. Just below the extremities of these tubes are two small bulbs containing mercury, forming the contact between the platinum wire sealed into the glass above and the copper conductor which enters from below. These conductors are held in place by plaster, which fills the base of the lamp."

The filaments are joined to short cylinders of carbon or graphite by means of holes drilled a little way into them; these holes are filled up with a cement composed of genuine Indian or Chinese ink and finely divided plumbago. At the other end of the cylinders holes are drilled to meet the ends of the filaments, but the inventor states that this is not absolutely necessary. In these latter holes short lengths of platinum wire are inserted, cemented as before; each length of platinum wire need not exceed $\frac{3}{4}$ of an inch in length. The other ends of the platinum wires are fused into tubes of lead glass and the wire ends come into the small glass globes filled with mercury. The mercurial contacts are arranged as stated by the committee.

The Italian grass from which the filaments are manufactured is stated by the inventor to be the *Andropogon Ischæmum* or *Chrysopogon Gryllus*. The grass is prepared by boiling in a 5 per cent. solution of caustic soda or potash; the outer skin is thus loosened and scraped off. The fibre is straightened by stretching it while still damp, and the straightened fibre is bound on a block of carbon, buried in plumbago in a sealed crucible and the crucible and its contents raised to a white heat. The fibres are thus ready for mounting as before described. If the resistance of the carbonized fibres proves to be too high Mr. Lane-Fox ingeniously incandesces them in a "Woulfe's" bottle contrivance through which a stream of coal gas or hydrocarbon vapour is passing continuously. The filaments are in connection with a measuring apparatus, and when the resistance is found to be nearly right, the filaments are mounted in their holders and the process repeated until the resistance reaches the exact figure necessary.

The Lane-Fox lamp was found by the Paris Committee to have a mean resistance cold of 55 ohms; at 16 candles this resistance became reduced to 27·4 ohms, and at 32 candles to 26·59 ohms. The current required when yielding 16 candles was 1·593 ampères with an electromotive force of 43·63 volts; at 32 candles the current was 1·815 ampères and the electromotive force 48·22 volts; 10·61 16-candle lamps were yielded per horse-power and 8·65 32-candle lamps, being 173·58 and 276·89 candles per horse-power.

The Lane-Fox lamp is worked by the Anglo-American Brush Electric Light Company. The luxurious richness of the installations of Lane-Fox lamps in the Alhambra Court at the Crystal Palace made the Brush Company's exhibit one of the most popularly attractive sights of the exhibition. The display was certainly an impressive demonstration of the ornamental capabilities of the incandescent electric lamp, such as cannot be imagined by those who had not the fortune to see it.

The next lamp that is commercially available to the public is the Maxim lamp, owned by the Maxim-Weston Electric Light Company, formerly known as the Electric Light and Power Generator Company. This lamp is of American origin, and is not yet so well known in this country as the preceding lamps; it, however, appears to be making its way slowly. It is one of the four lamps reported on by the Paris Committee. The following is the committee's description of the lamp. "The Maxim lamp is also globular in form. It has a short neck; within the neck rises a hollow cylinder of glass, supporting upon its summit a column of blue enamel, through which passes the conducting wires of platinum which carry the carbon. The filament is made of cardboard cut by a punch in the form of an M, in section, therefore, rectangular, and several times as broad as it is thick. It is carbonized in a mould, through which a current of coal gas is passed. After carbonization the filament is placed in an attenuated atmosphere of hydrocarbon vapour and heated by the current. The vapour is decomposed and its carbon is precipitated on the filament. In this way not only are the inequalities obliterated, but the resistance of the filaments may be equalized and brought to any standard required." The committee found the cold resistance of the Maxim lamp to range from 63 to 84 ohms, the mean resistance of the ten specimens tested being 72 ohms. The hot resistance when giving a light of sixteen candles was 41·11 ohms mean and 39·60 ohms at thirty-two candles. The current in ampères when yielding sixteen and thirty-two candles was 1·38 and 1·578 respectively. The electromotive force in the same order was 56·49 and 62·27 volts. These figures give 9·48 16-candle and 7·50 32-candle lamps per horse-power, or a total of 151·27 and 239·41 candles per horse-power in the two cases.

As a result of their experiments the committee come to the following four conclusions:—

1. The maximum efficiency of incandescent lamps in the present state of the subject, and within the experimental limits of this investigation, cannot be assumed to exceed three hundred candle lights per horse-power of current.

2. The economy of all lamps of this kind is greater at high than at low incandescence.

3. The economy of light production is greater in high resistance lamps than in those of low resistance, thus agreeing with the economy of distribution.

4. The relative efficiency of the four lamps examined, expressed in carcel burners of 7·4 sper-

maceti candles each, produced by 1 horse-power of current, is as follows:—(*a*) At sixteen candles, Edison, 26·5; Swan, 24; Lane-Fox, 23·5; and Maxim, 20·4. (*b*) At thirty-two candles, Edison, 41·5; Lane-Fox, 37·4; Swan, 35·5; and Maxim, 32·4. To double the light given by these lamps the current energy was increased, for the Maxim and Lane-Fox lamps 26 per cent., for the Edison lamp, 28 per cent., and for the Swan lamp, 37 per cent.

The foregoing are the only incandescent lamps of which, up to the present time, exhaustive tests have been published. It will, however, perhaps complete the subject-matter better if a brief description be given of the general notions involved in some of the more recently invented lamps which have been sold to various public companies, but of which nothing further is at present known than is contained in the respective inventors' patent specifications.

Mr. William Crookes, F.R.S., who has sold his lamp to the Gülcher Electric Light Company, takes cellulose, which he purifies by soaking in hydrofluoric acid, etc. He also claims the use of certain substances which are capable of absorbing the residual gas; he mentions thorina and alumina as suitable for this purpose. It is stated in the specification, No. 1422, 1881, that alumina absorbs residual traces of aqueous vapour. The method of utilizing this property is thus given:—After exposing the substance to the action of aqueous vapour the containing bulb is to be exhausted in the usual way until the exhaustion reaches, say, the one ten-thousandth of an atmosphere. On applying heat to the part of the glass containing the alumina occluded aqueous vapour is given off from the alumina. On re-exhausting as completely as possible a mere trace of vapour is left in the bulb; as the heated alumina cools down this residual trace of vapour is absorbed, thus rendering the vacuum practically complete. Mr. Crookes says that by operating in this way it is easy to push the exhaustion to a degree that would be impracticable by the use of a pump only. The vacuum thus produced will prevent an induction spark passing that would strike through several inches of air. The methods by which the purified cellulose is formed into filaments constitutes another patent, No. 2612, 1881. In this specification several different ways are given of treating the purified cellulose with an ammoniacal solution of cupric hydrate called cuprammonia, a well-known solvent of cellulose. In the first method the cellulose is taken in a manufactured form as thread, paper, etc. The material is passed through or dipped into the solvent for a few moments until the cellulose is acted upon to such an extent as wholly or partially to destroy its intimate structure, but not sufficiently to produce disintegration or solution. When sufficiently acted upon the material is allowed to dry by simple exposure to the air. The copper that remains behind is extracted with dilute acid; after extraction the material is washed thoroughly with water and dried between sheets of blotting paper.

Another process is to allow a cuprammonia solution of cellulose to evaporate in a shallow dish, with an accurately levelled plane bottom. When the skin or film left has acquired a sufficient consistency it is treated with dilute acid to extract the copper, thoroughly washed with water and dried under pressure between sheets of blotting paper.

The filament is prepared from the above material by cutting or punching out an adequate portion. The ends of the filament are strengthened by electro-depositing nickel or copper on them, and the junction between the conducting wires and the filament are painted with a thick syrupy cuprammonia solution of cellulose; after drying and carbonizing a good junction will be obtained possessing good conductivity from the finely divided metallic copper present. The carbonization is to be effected slowly in a gas muffle furnace, the filaments being buried in powdered charcoal and placed under moderate pressure during the operation, coal-gas is passed through the iron box in which the filaments are carbonized during the whole operation. If the filament after carbonization does not possess the right resistance or is imperfect, it is improved by heating it in a vacuous vessel containing a quantity of a high boiling point hydrocarbon, of which the vapour tension at ordinary temperature is low, such as naphthaline, or xylol or chloroform. These hydrocarbons, although present in quantity, emit an attenuated vapour, which is slowly decomposed and deposits carbon on or in the pores of the filament in a good conducting graphitoidal form. The manner in which the filament is mounted in its glass globe forms the subject-matter of another patent, 3799, 1881. This patent specification contains an interesting description of the manner of forming the glass envelope, which, however, could not be intelligibly described without the accompanying diagrams. The most notable feature is the device of using a cored wire conductor for sealing into the lamp. It is difficult to make a good junction between the glass and the metal except in the case of platinum; and with thin conducting wires of platinum the low conductivity of the metal causes it to heat when large currents are used, and to crack the glass or cause a leak at the junction. Mr. Crookes gets over this difficulty by using a compound wire having a core of copper, silver, gold, or other good conductor, and a platinum sheathing, so that there is the advantage either of using a cheaper metallic conductor or a metallic conductor of better conductivity, without any increased difficulty in making it form a good junction with the glass.

The patent specification of Tom Ernest Gatehouse, 3240, 1881, appears to be an attempt to use platinum as an incandescing material, the metal being kept from fusing by an alternative circuit of carbon, the principle taken advantage of being the familiar one that metals increase in resistance with elevation of temperature, while carbon, on the contrary, diminishes in resistance under these conditions. Upon these facts Mr. Gatehouse constructs a current regulator. Chatterton's compound* is used in filling the neck of the containing globe. This lamp is said to have been acquired by one of the numerous electric lighting companies that have been formed during the last few months.

The remaining incandescent lamp it is proposed to notice is the one invented by Mr. Desmond Gerald Fitz-Gerald. Specification No. 3890, 1881. The filament of the Fitz-Gerald lamp is formed of Swedish filter paper gelatinized by the action upon it of concentrated solution of chloride of zinc of specific gravity 1·876 or thereabouts. When the material is sufficiently gelatinized it is thoroughly washed with water acidulated with hydrochloric

* A mixture very familiar to telegraph engineers, composed of Stockholm tar, resin and gutta percha.

acid, next with a dilute solution of ammonia, and finally with water, then it is left to thoroughly dry and when ready for use is said to be very tenacious. The prepared filaments are carbonized in the usual way.

The carbonized filaments are cemented into short lengths of copper tube, ¾ of an inch being a suitable length; the cement used is a mixture of lampblack and platinum black made into a paste with water, sugar solution or starch; after drying, the cement tubes carrying the filament are heated to a temperature of not more than 1900° F., being protected from the air in the meantime.

Platinum conducting wires are connected with these tubes and are fused into the glass in the usual manner. The hollow in the base of the lamp is first filled in with a minute quantity of melted gum copal, and then fully secured by means of an infusible cement composed of litharge and glycerine diluted with about two-thirds its bulk of water; this cement is said to become very hard and impervious. The details of the lamp connections can scarcely be understood without the proper diagrams.

Arrangements are made to ignite a short length of magnesium ribbon in the glass bulb in order to facilitate the removal of the residual oxygen. The Fitz-Gerald lamp is owned by the Phœnix Electric Light Company, and has been exhibited at Westminster during the few last weeks.

The future of the incandescent electric lamp looks very promising, though the whole subject is yet in its infancy. Still the progress that has been made is truly astonishing and augurs extremely well for the immediate future of this young creation of the nineteenth century. It was intended to discuss the theoretical bearings of the incandescent lamp more than has been done, but the necessary descriptive matter has taken up such an amount of space as to make this quite out of the question.

(*To be continued.*)

NOTE ON CONVALLARIA MAJALIS.*

BY A. LANGLEBERT.

Recent communications made to the Academy of Sciences and Academy of Medicine, by Professors Vulpian and Sée have attracted the attention of the medical profession to a new remedy derived from the lily of the valley (*Convallaria majalis*). Without dilating upon the botanical characters of this beautiful little annual, belonging to the sub-order Asparageæ, I will briefly recapitulate its chemical composition.

The action of this medicament appears to be due to a glucoside and an alkaloid. Valz, in 1830, isolated from it two glucosides, "convallamarin" and "convallarin." In 1865, Stanislas Martin obtained an alkaloid, "maïaline," an acid, "maïalic acid," an essential oil, a yellow colouring matter and wax. This plant, therefore, contains several principles that are themselves subject to modification. In fact, under the influence of dilute acids, convallamarin splits up into sugar and "convallamaretin," and convallarin into sugar and "convallaretin." The chemical composition being known, it was necessary to determine the seat of the active principles, it being easy to foresee that the effects would be different according to the parts of the plant employed. The experiments made hitherto have indicated that all the activity resides in convallamarin and maïaline, convallarin appearing to be nearly inert.

Already for a long time the *Convallaria majalis* has attracted the attention of the scientific world. Cazin tried the flowers under the form of an electuary and obtained abundant stools; the root produced emeto-cathartic effects. Schultze prepared an alcoholic extract of the flowers, which was bitter and purgative with a dose of two grains.

Wouters, Peyrille, Cartheusen and Klein made it out to be a purgative analogous to scammony and aloes. I wish to emphasize this point, because one of the difficulties met with is the elimination, at least partially, of the purgative principle. The extract actually prepared is exempt from it.

In idiopathic epilepsy, headaches and convulsions, Senckenberg, father and son, employed it in doses of from 1 to 4 grams. Hitherto, it would appear, the action on the heart was not even suspected.

In 1880, some Russian physicians experimented with an infusion of the plant, but without sensible results.

Recently the *Convallaria majalis* has been tried by Professor Sée in his clinical practice at the Hôtel Dieu, physiological researches being made simultaneously in the laboratory by Messrs. Bochefontaine and Hardy. Alcoholates and tinctures of the entire plant and of the various parts were prepared, but the results upon the heart were not conclusive. Infusions, even in large doses (6 or 7 grams of the plant), were not uniformly successful. It became necessary, therefore, to prepare extracts of the entire plant and each of its parts, taking into account the action of the menstruum upon the active principles contained in the plant.

The aqueous, alcoholic and hydroalcoholic extracts prepared from the roots did not give the results sought for. In my opinion, the emeto-cathartic action which was observed in a series of extracts prepared by me, was to be attributed to the presence of too large a proportion of the roots.

The aqueous, alcoholic and hydroalcoholic extracts of the leaves are three times less active than the extract actually prepared. Moreover, the aqueous and alcoholic extracts of the root and leaves, whilst fulfilling the therapeutic indications, possessed emetic and purgative properties if the dose given were too high.

The extracts prepared from the flowers and stalks, gave good results, especially with animals, in which the cardiac phenomena observed were very remarkable; they were unaccompanied by emetic or purgative effects, but with very slight diuresis.

From the foregoing facts it would appear that each part of the plant employed produces a slightly varied effect. After several trials made with the flowers, stalks, leaves and roots, the best results were obtained with an aqueous extract prepared from the flowers and stalks of the *Convallaria majalis*, with the addition of a third of their weight of roots and leaves.

This extract, deprived in great part of the resinous purgative principle, is solid in consistence, shining black, possesses a very bitter taste, is soluble in all proportions in water and alcohol, and has an agreeable persistent odour. It is used in the preparation of an aromatized syrup, having a free bitterness without after-taste, and containing 50 centigrams of extract to a tablespoonful. It is under this form

* *L'Union Pharmaceutique*, xxiii., 338.

and in doses of 2, 3, or 4 spoonfuls that the medicament is prescribed in the treatment of cardiac affections.

EXPERIMENTAL RESEARCHES UPON THE CONVALLARIA MAJALIS.*

BY G. SÉE.

The lily of the valley has been known from time immemorial among the Russian peasants as a certain remedy for dropsy. This popular belief became in 1880 the subject of experiment by Messrs. Troitzky and Bojojawlensky, but insufficient was published to attract attention to the subject. The statements, however, being supported by Professor Botkin, of St. Peterburg, impressed the author, who took the first opportunity for their verification, it being necessary to procure the plant in flower to determine the active part.

The Russian physicians had spoken of infusions, without saying whether they were prepared from the flowers, leaves, stalks, roots, or entire plants. The various parts of the plant were therefore tried under the form of infusions, aqueous or alcoholic macerations, and lastly of extracts. The infusion of the flowers was without effect, even in doses equal to five or six grams of the flowers, whilst the tinctures and even the alcoholatures were infinitely less active than the extracts, which M. Sée classes as follows, according to their order of merit:—(1) aqueous extracts of the leaves, which require a dose three times as large as the extracts from other parts of the plant; (2) extracts of the flowers, which exercise upon animals a very energetic action, and upon man a much less intense one; (3) extracts of the entire plant, including flowers, stalks, and roots.

Valz, in 1830, obtained from the aqueous extract of the dried flowers and roots the toxic principle called "convallamarin;" the alcoholic extract yields "convallarin," which is of little importance. The former principle is a glucoside, splitting up, under the influence of acids, into sugar and convallamaretin.

M. Hardy, demonstrator of chemistry in the laboratory of the Hôtel-Dieu, has obtained convallamarin in the amorphous state. It was obtained from extracts of the plant, by Dragendorff's process; treating the acidulated aqueous extract with alcohol and then with chloroform or amylic alcohol. This principle has an activity comparable to that of pure digitaline, with which experiment shows it to have points of analogy as well as of difference.

In order to arrive at the therapeutic dose of the extracts to be given to man, preliminary trials were carefully made first upon animals. By an approximative calculation, based upon corporeal weight, the dose useful in cardiac disease was determined. It may be thus formulated: 1 gram to 1½ or even 2 grams of extract of the flowers or of the entire plant; extract of the leaves is only active with double this dose.

EXTRACT OF MALT.†

BY THOMAS T. GOODALE, PH.G.

In preparing extract of malt, cleanliness is of primary importance. The vessels should be thoroughly washed in some alkaline solutions, such as solution of soda or potash, to prevent any substance from adhering to them, and, when not in use, should be filled with lime water. If these precautions are neglected, acetification is sure to follow, and the preparation is spoiled. Care must also be taken that the malt be fresh, as it sours and becomes unfit for use if it has been crushed more than three or four days. The grain must be reduced to a moderately fine state, and the best mode is that which crushes it and loosens the husk from the fleshy part without separating the two. Each shell then forms a filter through which the clear liquor percolates, leaving behind any matter which might be mechanically taken up. When ground in a mill, the grain is so disintegrated that it is apt to set during the process of extraction, and form a mucilaginous magma which retains much of the liquor. This cannot be removed except by repeated washings; a very dilute extract is then produced, which is liable to acetification in the succeeding treatment. In order to obtain a concentrated and bright liquor, the saccharine and amylaceous matters must be extracted with the smallest amount of water, and maintained at a proper degree of heat. The grain will be completely exhausted by one mashing, if successfully conducted. Failure may result from two causes: when a mucilaginous mass is formed in consequence of too elevated a temperature, or when the grain is too fine, the liquor cannot be drawn off freely, and the grain is, therefore, not thoroughly exhausted. If, on the other hand, the temperature is too low, the starch is not converted into dextrin and glucose, but is carried off in suspension. The washing apparatus which was found most convenient consists of a tub similar to that used by brewers, smaller at the bottom than at the top, with a finely perforated bottom fitted to it. In the side, between the true and false bottoms, is placed a faucet. Fitting into the perforated bottom, and passing through the cover, is a mixer, which is an upright shaft having cross-bars attached, running at right angles to it. A cog-wheel fitted to the top of the shaft, together with a crank, communicates power to it. A cover made of heavy felting was adjusted to the tub. Wood and felt being both non-conductors, any desired temperature can be constantly and perfectly maintained for many hours. Care must be taken to keep the heat of the mash at 160° F., the conversion of starch into dextrin and glucose being best effected at that degree. The freshness, hardness, and dryness of the grain exert an influence on the temperature. When very dry, heat is generated, and the conversion of the starch causes a still greater elevation of the temperature. Boiling water is poured into the tub, and when the heat has fallen to 165° F., the malt is gradually added and thoroughly stirred in. The temperature is now brought to 160° F., and the tub is closely covered to maintain the heat. After stirring a short time, the mash is allowed to remain at rest for two hours. At the end of this time, the faucet is carefully turned until it is half open. The liquid which flows out should be perfectly bright and clear, and great care should be used to prevent fine particles of grain or any solid matter from passing out. After drawing all the liquid from the tub, a fresh quantity of water heated at 160° F. is sprinkled on the grain, allowed to remain about an hour, and then drawn off as before. If the grain is not exhausted, this operation must be repeated, but nothing of value will remain after two macerations if they have been properly conducted. When three macerations are necessary, the resulting liquor is so dilute that acetification is apt to take place before it is evaporated. In practice, in order to obtain at once a very concentrated extract which should contain all the valuable properties of the grain, the liquid obtained from the first washing is returned to the tub and drawn off in a hour. It is then only necessary to sprinkle on sufficient hot water to force out the liquor held by the grain. If the process has been successful, the extract will be the exact colour of the grain used, will have a good head, be finely flavoured, and effervesce. When the temperature has been too high, the white head has a tinge of brown, and the colour of the extract deepens in exact proportion to any excess of heat. If, on the contrary, the temperature has not been high enough, the liquor is less bright and lively in flavour. When the heat has been very low, the characteristic head will not stand, but flies off immediately, and the liquor will be thick and mucilaginous, and quickly spoil when exposed to the air.

* Abstract of a paper read before the Academy of Medicine (*L'Union Pharmaceutique*, xxiii., 337).

† Abstract of a thesis presented to the Massachussets College of Pharmacy (Boston). From *New Remedies*, March, 1882.

This process differs greatly from Mr. Ebert's, by which the malt is digested for a short time at a temperature of 125° F., and then strained. The liquor obtained contains the diastase. The residue is boiled with fresh water, and strained, and the resulting liquor contains the starch. The two solutions are then mixed and kept at a temperature of 160° F. until the starch is completely changed into grape sugar, which can be readily ascertained by the iodine test. If a higher degree of heat is used, the diastase of the grain is coagulated, and becomes insoluble and inactive. After straining and filtering, the liquor must be carefully evaporated to the proper consistence. The importance of having the liquor perfectly clear and bright was shown by a series of eight experiments as follows.

Experiment No. 1.—The liquor was pale and not very bright. It was placed in a shallow vessel over a water-bath, and constantly stirred. The albuminous matter which made its appearance during the operation was removed, and the evaporation continued until an extract of the consistence of honey was obtained. It was light brown in colour, with a sweet taste, and had the odour of malt. At the end of two weeks it showed no change, but in four weeks, a thin crust had made its appearance. After eight weeks, the mass had separated into two distinct layers. The upper one, or crust, which formed about one-third of the whole, was a shade lighter in colour than the original extract, and quite tough and pliable. It had a starchy appearance and taste, and, when tested with iodine, gave the blue reaction characteristic of starch. The lower layer was a trifle lighter and more liquid than the original extract, and had an agreeable sweet taste and odour. With iodine, it gave negative results, showing the absence of starch. These layers were separated and again examined in four weeks. The crust had grown somewhat harder, but otherwise remained the same. The lower layer showed no change. The peculiar behaviour shown in this case was thought to be due to the separation of the solid and starchy matter of the grain, which had been held in suspension, but which separated when the liquor was evaporated.

Experiments Nos. 2, 3 *and* 4.—These three lots were made in the same manner as No. 1, except that particular care was taken to obtain the liquor perfectly clear and bright. The same process of concentration was strictly followed. When finished, all presented the same appearance, and exactly resembling the lower layer of No. 1, in colour, taste, and odour. At the end of eight weeks, all remained light-brown clear extracts. The liquor used in all the preceding experiments was made in a mash-tub.

Experiments Nos. 5 *and* 6.—The liquor used in these experiments was made by Ebert's process. When first strained, it had a pale starchy appearance. Being shaken with paper-pulp and again strained, a perfectly clear, bright colour was obtained. The method of evaporation was precisely the same as in previous experiments, and the product resembled in every particular those resulting from Nos. 2, 3 and 4. Examination at the end of eight weeks showed no change.

Experiment No. 7.—The liquor used in this experiment was made by Ebert's process, but was merely strained, not brightened. At the end of eight weeks, the peculiar formation noted in No. 1 had made its appearance. After separation, the lower layer remained unchanged, and presented every characteristic of a good extract.

Samples from Nos. 2, 3, 4, 5 and 6 when tested for starch gave negative results.

These experiments, then, proved the correct use of the theory that the peculiar formation noticed when turbid liquors were used, was due to the presence of the solid and starchy matters of the grain, which had passed out in suspension; and that no such formation will take place when the liquor is perfectly clear and bright. Filtering, which is necessary in Ebert's method, renders the process impracticable for large lots, as it is long and tedious.

When made in a mash-tub, the liquor is obtained at once perfectly bright and clear, and is ready to evaporate.

Having obtained a bright liquor, which is necessary, the next step was to find a process by which this liquor could be evaporated in considerable quantities at once, and, at the same time, be made to yield a preparation of a light and uniform colour. When evaporated in the ordinary manner in an open pan, good results can be obtained by constant stirring and careful regulation of the heat, provided the quantity of liquor is small. In making large lots, the long-continued heat necessary to reduce so much liquid produces an extract very dark in colour, and sometimes black. This process, is, therefore, impracticable. The vacuum-pan presented itself as a ready solution of the problem, since, by it, a very bright sweet extract can be made, which, in taste, odour, and particularly in colour, is all that can be desired. This method, however, was abandoned, as the aim was to find some process which would not require complicated or expensive apparatus. The plan of evaporating in very shallow pans at a low temperature was then tried. The clear liquid was poured into tin pans ¾ of an inch in depth. These were then placed in a drying closet having a heat 80° to 90° F. The result was but little inferior to what was sought, namely, a sweet extract entirely free from any burnt appearance or taste, with an odour resembling fresh bread. The amount of room necessary to carry out this plan led to its abandonment. The fact that the exposure of a very large surface to the air greatly facilitates evaporation, then led to the adoption of an apparatus by which this advantage was secured, and a very low degree of heat could be employed. There being no ceiling to the room in which the experiment was conducted, two wooden uprights, 12 inches wide, which reached nearly to the bottom of a jacketed kettle underneath, were fastened to adjacent floor-beams above. A wooden roller passed from one upright to the other near the bottom, while near the top two rollers were placed parallel to each other. Over these rollers, a band of cloth was passed, forming, as it were, a letter V closed at the top. Power was communicated by means of a crank attached to one of the upper rollers. The kettle being filled with the clear liquor, steam was turned on until the temperature reached 80° to 90° F., and the heat was kept at this point until the operation was finished. The belt was now set in motion, and passing through the liquor, brought the warmer portions to the surface, and carried a considerable part with it as it passed over the rollers. By this method, a large quantity of liquor can be quickly reduced to a small bulk by a low heat, and with little labour. The rapidity of the evaporation is increased by directing a current of air upon the band, and is also, of course, somewhat in proportion to the length of the band and the amount of surface thus exposed. This process yielded a very satisfactory product, very light in colour, and free from any burnt taste. When compared with lots made in the ordinary manner, its superiority was very marked. Here, then, was a method which gave good results, required only just sufficient heat to warm the liquor, and was easy in manipulation, while the apparatus was inexpensive and occupied but little room.

A freezing process next presented itself as possessing two great advantages, namely, the entire absence of heat during concentration, which would render the formation of caramel impossible, and the great preservative power of cold. The operation was conducted as follows:—The clear liquid, when cold, was frozen in an ordinary ice-cream freezer. The ice-cake was then broken, placed in a strong canvas bag, and firmly pressed in a tincture press. The ice-cake remaining in the press was of a pale straw colour. The liquid expressed was again frozen and pressed, and the process continued until a thick syrupy liquid was obtained. This was placed in shallow pans in a warm drying closet, and in about an hour was of the proper consistence. The finished extract was superior in

appearance to any which I have yet seen, but the yield was less than in previous experiments, the ice-cake retaining some of the liquor. In subsequent experiments, the ice-cake was divided into several portions; these were put into separate bags, and iron plates placed between them. All were then pressed until the liquor ran white. The ice-cake remaining should be colourless. The liquor was again frozen and again pressed in the same way until the product could no longer be frozen; it was then finished in the drying closet as before. The yield was now satisfactory.

We have then two methods of concentration, each possessing its own special advantages. The first, in which a large evaporating surface is obtained by means of a belt of cloth, recommends itself by the simplicity of the apparatus and its economy in time and labour, while the finished product is of good appearance. The readiness with which this method may be employed in every store, will probably render it the most useful, The second, or freezing process, has the advantage of giving an exceptionally superior product free from all colour except that obtained from the grain.

To sum up, in order to prepare a good malt extract, the best malt must be used, a uniform and proper temperature must be maintained during the washing process, care must be used in drawing off the liquor, to prevent the solid matter of the grain from passing out, the exhaustion of the grain must be accomplished with as little water as possible, and the concentration must be effected rapidly at a low heat. By careful attention to these details, an extract will be obtained, which will be handsome in appearance, and contain all the valuable properties of the grain.

QUASSIIN.*

BY A. CHRISTENSEN.

The literature upon the chemical constituents of quassia wood is very inconsiderable. In 1806 Thomson† mentioned that by digesting quassia wood with water and evaporating he obtained a very bitter substance, which when warm was soft, and became brittle upon cooling, and which, in his opinion consisted principally of the pure bitter constituent; it gave a slight precipitate with tincture of galls. In 1811 it was stated by Pfaff‡ that the bitterness was completely extracted by cold water. In 1826 Buchner introduced 1 grain of the alcoholic extract into a wound in a rabbit, which was followed by the death of the animal. Another investigation of the extract by Keller§ contains nothing of importance.

Quassiin was first prepared by Winckler|| in 1835 as follows. Three ounces of quassia wood were extracted with 2 pounds of 80 per cent. alcohol. After evaporation in a water-bath the residue was dissolved in water, and the solution filtered and evaporated to the consistence of an extract. The extract was exhausted with absolute alcohol, evaporated almost to dryness, and then again exhausted with boiling water. The light-yellow solution, decolorized by animal charcoal, left after slowly evaporating crystals of quassiin. Winckler described this substance as crystalline, difficultly soluble in water and freely in alcohol, faintly alkaline, giving a precipitate with tannic acid, and as being obtained crystalline most easily from water.

Subsequently Wiggers¶ prepared quassiin by repeatedly boiling 8 pounds of quassia wood with water, evaporating the filtered decoction to 6 pounds, cooling, adding lime and allowing the mixture to stand a day with frequent shaking, filtering, evaporating nearly to dryness and then boiling with 90 per cent. alcohol. From the solution, which according to Wiggers contained, besides quassiin and colouring matter, some sodium chloride and potassium nitrate, the alcohol was distilled off and it was then evaporated to dryness. The residue was dissolved in the least possible quantity of alcohol and mixed with a considerable quantity of ether, which separated much colouring matter. The filtrate was now again evaporated, and dissolved in absolute alcohol and ether and this repeated until the residue was colourless and free from saline matter. Lastly the ethereal solution was poured into a small quantity of water and left to evaporate spontaneously.

Wiggers found for quassiin the formula $C_{20}H_{25}O_6$. According to him it loses 1·3 per cent. of water at 100° C., and 0·37 per cent. more upon fusing. The melting point, he says, lies a little above that of the resin. He found it dissolve in 220 parts of water at 12° C., and it did not neutralize acids. It crystallized by spontaneous evaporation from a solution in alcohol and ether which was mixed with water, and also when a warm saturated alcoholic solution was mixed with boiling water and allowed to cool. The quassiin of Wiggers was precipitated by tannic acid, but not by metallic salts.

In commencing the present investigation, Herr Christensen first directed his attention to find a new method of preparation, since the methods of Winckler and Wiggers yielded it in a very impure condition and the operations for its purification would involve considerable loss. The author tried two methods that are available in the extraction of several bitter substances: (1) treatment of a solution of the watery extract with bone black and exhaustion of this with alcohol; and (2) precipitation of the watery extract with tannic acid, decomposition of the washed precipitate, extraction with alcohol, etc. In both cases, by evaporating slowly, he obtained tabular crystals, having an intensely bitter taste, leaving on combustion no ash, difficultly soluble in water and fairly soluble in alcohol. The solutions gave with tannic acid a dense white precipitate.

Notwithstanding that the quassiin is tolerably completely removed by bone black, as is shown by the fact that the filtrate tastes only slightly bitter, the tannic acid method has the advantage that it yields the purer product. The following method was adopted by the author for the preparation of quassiin:—

Five kilos of quassia were boiled several hours with two successive quantities of water. The united filtrates were evaporated, at first over an open fire, subsequently on a water-bath, to 1½ litres. After cooling this was filtered and the filtrate precipitated with tannic acid, taking care to keep the reaction neutral or faintly acid by the addition of carbonate of soda, since the compound of quassiin with tannic acid, like many similar compounds of bitter substances with that acid, is very soluble in it. The precipitate, after the addition of well-washed pipe-clay is easily collected and removed by filtration. The precipitate after being repeatedly washed was mixed whilst moist with a considerable quantity of freshly precipitated lead carbonate, and evaporated to dryness in small portions, with frequent stirring, upon a water-bath. The mixture was extracted four times with alcohol, the alcohol distilled off and the residual liquid evaporated until the separation of crystals of quassiin, which were washed and dried between filter-paper. The filtrate yielded more crystals upon further evaporation, and some more quassiin was separated by shaking it with chloroform. Lastly, the quassiin was recrystallized from ether-alcohol and water.

In the place of lead carbonate, calcium hydrate also was used for the decomposition of the tannic acid compound, and an alcoholic solution obtained that was not so much coloured, but the yield was smaller.

* Abstract of a communication from the Strassburg Pharmaceutical Institute (*Archiv*, xx., 481).

† *System der Chemie*, iv., 47.

‡ *System der Materia Medica.*

§ Buchner's 'Repertorium,' ii.

|| Buchner's 'Repertorium,' liv. (1837), 85, and lxv. (1839), 74.

¶ *Annalen der Pharmacie*, xxi. (1837), 40.

Upon evaporating the watery extract of quassia wood, a considerable precipitate separated as a smeary mass. This was treated with freshly precipitated lead carbonate, evaporated almost to dryness and extracted with 84 per cent. alcohol. After the alcohol had been distilled off, and the liquid sufficiently evaporated, some quassiin separated, but in an impure condition.

Quassiin is very freely soluble in chloroform, and by shaking an aqueous solution of it with chloroform it can be nearly entirely removed. The author therefore tried to obtain the quassiin from the aqueous extract of quassia wood by simply shaking this with chloroform; but the practical difficulty was met with that the chloroform does not completely separate it, and a pasty, slimy mass was formed, the consistence of which was not altered even upon warming. After the chloroform had been distilled off a very impure residue was left, from which the quassiin was only obtained by repeated recrystallizations from ether-alcohol mixed with a little water. Neither can direct exhaustion of the quassia wood by chloroform be adopted in the preparation of the quassiin, since much resin is taken up with it, and this can only be separated by the ether-alcohol method, which involves considerable loss. The last two experiments show, however, that quassiin exists as such in the wood, and is not a product formed during the treatment.

The quassiin, obtained as above described with tannic acid, was purified by recrystallization from the smallest possible quantity of warm alcohol, in which it is so much more soluble than in cold that the solution solidifies into a paste upon cooling. After the crystals had been washed with dilute alcohol and dried between filter-paper and then over sulphuric acid they were white and gave a colourless solution. They were recrystallized once more by the addition of boiling water to a hot concentrated alcoholic solution; the crystals that separated on cooling showed the same melting point as those of the first crystallization and were used in the further experiments.

With respect to the proportion in which quassiin occurs in the wood, the author obtained from 18 kilos of Jamaica wood (*Picræna excelsa*) 12 grams of impure substance, equal to 0·6 per 1000. But in treating a subsequent consignment, both of Jamaica and Surinam wood, he found to his surprise that in repeated experiments upon considerable quantities of both kinds he could obtain scarcely any quassiin. A sample of *Quassia amara* wood, that yielded 2·8 per cent. of extract, and one of *Picræna excelsa* wood, that yielded 2·6 per cent., yielded no quassiin. The sample of *Picræna excelsa* wood that gave 0·6 per 1000 of quassiin yielded 3·2 per cent. of extract. The author is unable to explain the cause of this difference; but if the value of quassia wood is dependent upon the proportion of quassiin it contains, the results do not afford much justification for the exclusion of the Jamaica wood from some pharmacopœias.

Pure quassiin forms very thin rectangular double refracting crystalline scales. It has an intensely bitter taste, is without smell, permanent in air, and gives neutral solutions with alcohol, water, etc. It melts at 205° with slight puffing—possibly due to the giving off of water—to a yellow resin-like mass, which upon solution and recrystallization is recognized as unaltered quassiin.

Water, left in contact with finely powdered quassiin several days, with frequent shaking, at 15° C., dissolved 1 part in 1230. A warm saturated solution left forty-eight hours at 15° C., with frequent shaking, contained 1 part in 735. Boiling water dissolves quassiin with difficulty, but much more freely than cold. In alkalies it dissolves with a yellow colour very readily upon boiling and separates unaltered on the addition of acids, becoming again colourless. It is dissolved by alkalies in the cold somewhat more easily than by water, turbidity resulting upon neutralizing the liquid with acids. Boiling alcohol dissolves it very freely, but cold alcohol much less so, 1 part of quassiin requiring 30 parts of 84 per cent. alcohol at 15° C. In ether and petroleum spirit it dissolves with difficulty, but very freely in chloroform, of which 2·1 parts dissolve 1 part of quassiin. A solution in chloroform is dextrogyre, the specific rotation being $\alpha_D + 37·8$.

Quassiin contains no nitrogen. After being dried to a constant weight over sulphuric acid, it did not alter in weight when exposed for an hour to a current of dry air at 100° C., and gave upon analysis results corresponding with the formula $C_{31}H_{42}O_9$.

	Calculated.	Found.
C	66·66	66·90
H	7·52	7·44
O	25·82	25·65

An aqueous solution of quassia is not rendered turbid by metallic salts. A saturated alcoholic solution gives no precipitate with a similar solution of neutral lead acetate, and upon evaporation the quassiin separates unaltered. Other saturated alcoholic solutions of metallic salts behaved similarly. Tannic acid produces in aqueous and alcoholic solutions of quassiin a white precipitate which is soluble in acids and in caustic and carbonated alkalies.

Dilute hydrochloric and sulphuric acids dissolve quassiin in the cold somewhat more freely than water, but 5 to 10 per cent. solutions, even after being heated in sealed tubes to 125° for an hour, did not reduce alkaline cupric tartrate, showing that quassiin is not a glucoside.

By treatment of quassiin with a 3 per cent. solution of sulphuric acid a new compound was obtained, crystallizing in fine needles, and having only a slightly bitter taste. It melted at 237° C., did not lose all its water of crystallization (four molecules) till 110° C., and when anhydrous gave upon analysis results corresponding with the formula $C_{31}H_{38}O_9$. It was very sparingly soluble in water, required 180 parts of alcohol at 15°, dissolved very freely in caustic potash and caustic soda, and gave no precipitate with tannic acid. There was also a formation of resinous matter that could not be crystallized and possessed an intensely bitter taste.

A strong solution of quassiin in chloroform decolorizes bromine, with formation of hydrobromic acid. The author obtained a bromine compound as a white amorphous mass, with a taste even more bitter than that of quassiin; this compound dissolved in alkalies with an intense yellow colour, distinctly produced by the smallest traces, and at the same time lost its bitter taste almost completely.

An experiment made to test statements as to the occurrence of an essential oil in quassia wood gave negative results, a small quantity of solid white substance that collected on the surface of the aqueous distillate proving to consist of free fatty acid.

"MANICURE."*

A number of persons at New York and at frequented summer resorts have for some time past been doing a profitable business in the treatment of the hands and finger-nails of those who consider themselves to be in need of such service. In a recent number of the *Art Interchange*, published in that city, the editor gives the following reply (in substance) to a correspondent who wishes information concerning the methods and materials employed. It is not unlikely that some of our readers may find it profitable to prepare the materials requisite, and give the necessary directions for their use.

For cosmetic gloves, take chamois or castor—the best quality is not necessary—three sizes larger than the person ordinarily wears; rip them open and spread them with the pastes below described. If you call at the lady's house and examine her hands, and learn what they need

* From *New Remedies*, June, 1882.

and the number of her gloves, you can prepare accordingly, and order gloves to be worn at night. The following is a useful prescription for whitening the hands, to be preceded by baths and washes, to be described further on.

Cosmetic Paste, No. 1.—Myrrh, 1 ounce; honey, 4 ounces; yellow wax, 2 ounces; rose water, 6 ounces; glycerin added according to thickness of paste, just enough to make it spread easily. Melt the wax in a dish over boiling water, add the myrrh while hot; beat up together, then add honey and rose water; beat again, and lastly add glycerin from a teaspoonful up; spread over the inside of the gloves; then sew them up; they are ready for use.

Cosmetic Paste, No. 2.—Two teaspoons of oil of sweet almonds; one ounce of rose water, thirty-six drops tincture benzoin; one teaspoonful glycerin; yolks of two fresh eggs; one teaspoonful of rice flour. Beat to a paste, and line gloves, or rub on hands, and wear close-fitting gloves over it at night.

Cosmetic Paste, No. 3.—One teaspoonful of the best pine tar; 1 pint pure olive oil. Melt in tin cup over boiling water. This can be kept on hand, and, if preferred, may be perfumed with rose water. To be spread on hands and worn with gloves. One application will not be sufficient; the beautifying of the skin is a work of more or less time, according to its condition.

Ground barley, the white of an egg, 1 ounce of honey, and a teaspoonful of glycerin spread thickly inside gloves, and worn at night, is a useful recipe for the hands.

Another recipe for whitening the hands, and an inexpensive one to prepare, is composed of home-made soft soap, half a pound; salad oil, 1 gill; mutton tallow, 1 ounce; boil together, then add, when away from fire, spirits of wine, 1 gill; ambergris or some other perfume, according to fancy; benzoin would answer. Spread on gloves and wear at night.

For ordinary use to keep the hands white where they are used in house work, bran mittens are excellent. Make good-sized mits of cloth, fill with wet bran or oatmeal first, washing the hands with vinegar and glycerin, or lemon-juice and glycerin rubbed in afterward; then put the bran mittens on; tie closely at wrist and wear them every night, or at regular intervals as needed.

Alum added to white of egg and rose water is good for making the flesh firm; a trifle of glycerin added is an improvement.

Colour for Finger-tips.—A pinkish tint is thought to be desirable for the tips of the fingers; it can be attained by the use of the following: $\frac{1}{8}$ ounce of alkanet root chippings soaked for a week in alcohol diluted with water will give a lovely stain for the finger-tips; apply by dipping a bit of raw cotton in the mixture, and touching the finger-tips with it.

Polish and Colour for the Nails.—Rub the nails, which must first be carefully trimmed with sharp scissors, with equal parts of cinnabar and fine emery powder, and afterwards with scented oil of almonds.

To Remove Spots.—Pitch and myrrh melted together and laid over the nails over night will soon cause white specks to disappear. Butter or cream will remove the pitch in the morning.

For Removing Discolorations.—Two ounces of fine almond soap (white soap is always best) dissolved in 2 ounces of lemon-juice, to which must be added 1 ounce of oil of almonds and a trifle of carbonate of potash and one teaspoonful of glycerin, stirred up until like soap, is excellent to wash the hands with occasionally, but it must not be used where the skin is chapped or abraded.

A fine toilet salve, and useful for chapped surfaces, is made with 2 ounces of oil of almonds, 1 drachm each of wax, spermaceti, and glycerin, melted together and perfumed by 2 ounces of rose-water and $\frac{1}{2}$ ounce of orange-flower water.

Fine pumice stone smoothed and rounded is exceedingly useful for smoothing the palms of the hands, and the fingers. As a first step in beautifying the nails, lather well with warm soap suds from a pure white soap; dry, and while the nails are softened, trim carefully, push down the skin all around to show the shape of the nails and the little half moon at the base of the nails; remove hangnails, and then polish and cover with powder described for the purpose. It would be well to treat the hands at the first, and then remove specks from nails and finally polish. The polishing may afterwards be done by the lady at home, if desired. Use different prescriptions, according to state of hands. Bran in warm water and vinegar is useful for a wash; make into lather with fine white soap, and rub the hands well with the bran. Indian meal and oatmeal are also goods for a preparatory bath before trimming and polishing nails and using cosmetic preparations. The various cosmetics can be sold at prices according to their first cost. The washing cosmetic with potash need only be used once or twice, and is useful after the bran bath or before; the cosmetic gloves may follow for night use. Always use pure white soaps; almond soap, glycerin and lettuce-oil soap, are to be recommended; also the oatmeal and pumice soaps where the skin will bear the latter.

THE FORENSIC-CHEMICAL DETERMINATION OF GELSEMINE IN ANIMAL LIQUIDS AND TISSUES.*

BY EDWARD SCHWARZ, M.D.

The author briefly reviews the investigations of H. Kollock (*Amer. Jour. Phar.*, 1855, p. 263), C. L. Eberle (*Ibid.*, 1869, p. 35), Professor Wormley (*Ibid.*, 1870, p. 1), and Dr. C. A. Robbins (*Ibid.*, 1876, p. 191). Professor Wormley's more recent investigation (*Ibid.*, 1877, p. 150), appears to have escaped his attention. The method recommended by Dragendorff (*Jahresbericht für Pharmacie*, 1878, p. 640), was used for the preparation of the two important principles; gelsemic acid was obtained from the acidulated solution by agitation with chloroform, and gelsemine by agitating the liquid rendered alkaline by ammonia with benzol.

The chloroform solution, on evaporation, left a crystalline residue, which dissolved partly in water, with a yellow colour, and showed a strong blue fluorescence. The small insoluble portion was dissolved in alcohol. Both solutions, placed over sulphuric acid, yielded crystals; those from the watery liquid were light yellow-brown fine needles, being comb-like, attached to a larger prismatic crystal. These crystals showed all the reactions of æsculin except that they acquired a greenish colour with ferric chloride, due probably to the presence of æsculetin. The crystals from the alcoholic solution emanated from a central point, and were branching in a tree-like manner; in the deeper part of the vessel several thornapple-like aggregations of crystals were observed. The amount obtained from 50 grams of the root was so small that accurate investigations could not be made; moreover, the presence of æsculin seemed to interfere with the reactions of this substance.

The benzol solution yielded, on evaporation, a dark brown, resinous mass, which was dissolved in dilute sulphuric acid and precipitated with concentrated soda solution; the precipitate collected, washed and dried formed a white powder, which caked together in boiling water to a brown mass, and showed the behaviour of gelsemine. The filtrate agitated with chloroform, yielded a pale, rose-coloured substance, having the same behaviour. The total yield weighed between 0·2 and 0·3 gram.

Another experiment made with the powdered root proved that the acidulated liquid yields to amylic alcohol

* Abstract from an Inaugural Essay presented to the University of Dorpat, and communicated by the author. From *The American Journal of Pharmacy*, August, 1882.

considerable æsculetin, recognizable by the dark green colour with ferric salts, and by the blue-green fluorescence in aqueous solution, which is destroyed by potassa. The residue also gave distinct alkaloidal reactions with bismuth-potassium iodide, picric acid, and iodine.

The following tests were made with æsculin and æsculetin, not with the similar principle obtained from gelsemium.

To the well-known reaction of æsculin and æsculetin must be added their behaviour to *Langley-Koehler's test*, which is very similar to that of picrotoxin,* except that the colour with æsculin is deeper brown, and with æsculetin, red-brown. Æsculin and brucine have also a similar reaction, namely, to *chlorine water* (red colour). *Gold chloride* is reduced by æsculin, the colour depending on the concentration and temperature of the liquid; it yields, with aqueous solutions of æsculetin, a raspberry-red colour. *Potassium ferridcyanide* does not affect æsculin, but, on boiling, colours æsculetin solutions red-brown. The same reagent, *with ferric chloride*, gives with both an intense green-blue colour, and gradually causes a blue precipitate. Solution of *copper sulphate* remains blue with æsculin, but turns green with æsculetin.

A solution of 0·5 gm. æsculin in 50 c.c. of water was given to a cat without producing abnormal symptoms; the acid urine let after two hours had a strong fluorescence. Another cat took 0·1 gm. æsculin. The aqueous solution of the fæces of the first and second day was strongly fluorescent; from the third day, æsculin could not be detected. The urine was likewise fluorescent on three days, but not on the fourth day until after it was rendered alkaline; chloroform extracted from it æsculin.

Subcutaneous injections of æsculin, ·0066 and ·0003 gm., were made to two frogs, and these were afterwards placed in distilled water, which for nine days became fluorescent.

The author concludes, from these experiments, that

1. Æsculin is without decided action upon the animal organism.
2. It rapidly enters the second ways from the stomach and intestines.
3. It is not decomposed within the body, and
4. Is rapidly excreted through the kidneys.
5. A prolonged time is required for its complete excretion.
6. Powdered æsculin is partly eliminated with the fæces, probably owing to its sparing solubility.

The "animal quinine" obtained by Bence Jones from the kidneys of higher animals, which, however, has not been observed by Dragendorff, is not fluorescent in alkaline solutions.

The experiments with the alkaloid were made with such prepared by the author, and with pure gelsemine made by Merck. If merely moistened with sulphuric acid and then brought in contact with a minute drop of solution of potassium bichromate, the colour produced and the changes closely resemble those observed with strychnine; but if, as suggested by Robbins, the alkaloids are dissolved in strong sulphuric acid, and the bichromate added to the solution, gelsemine yields a cherry-red colour, changing to dingy grey-brown, and green spots or streaks are not unfrequently observed, due to absorption of moisture. Strychnine becomes violet-blue, then cherry-red, finally brick-red, the latter colour lasting more than a day. Quebrachine becomes slowly violet-blue, and, after a long time, acquires a red tint; but, if dissolved in trihydrated sulphuric acid, no reaction is observed with potassium bichromate, as is also the case with curarine; but under the same condition the cherry-red colour of gelsemine changes to an intense green or bluish-green.

On substituting manganese binoxide for the bichromate, almost identical results are obtained; but using concentrated sulphuric acid, the colorations of gelsemine, and particularly of quebrachine, are much darker and handsomer. With the bihydrated acid, quebrachine gives only a slight violet colour; in the presence of trihydrate the dark green colour of gelsemine appears slowly, and, with a greater dilution of the acid, the blue-violet colour of strychnine in the beginning is more and more replaced by cherry-red.

The same reactions, made by ceric oxide, yield lighter and less intense colorations, the green from gelsemine having a bluish tint.

The weakest colorations are produced by lead peroxide only in presence of a trace of nitric acid; the tint from gelsemine is grass-green.

The reaction best adapted for gelsemine is sulphuric trihydrate and one of the four reagents, when the final colour by gelsemine is green, and by strychnine, brick-red.

Concentrated sulphuric acid dissolves gelsemine with a yellow-brown colour; quebrachine, similar; strychnine, colourless.

Sulphuric acid containing iron shows no reaction with gelsemine and strychnine; a blue-violet colour with quebrachnine.

Froehde's reagent: With gelsemine, roe-brown to red-brown, gradually yellowish-green (a very similar reaction was observed by Graebner with ptomaines); strychnine, no change; geissospermine and quebrachine, blue.

Selen-sulphuric acid, with gelsemine, no reaction.

Sugar and sulphuric acid: Gelsemine, cherry-red; but fats, biliary acids, aconitine, codeine, and delphinidine give the same colour; strychnine, no red colour; quebrachine, intense cherry-red.

Brouardel-Boutmy's reagent (potassium ferridcyanide and ferric chloride): Gelsemine and quebrachine, intensely green; strychnine and aspidospermine, no reaction. Ptomaines obtained from the stomach and intestines, no reaction; but if isolated from the liver, kidneys, etc., by agitation of the alkaline liquid with benzol or chloroform, a slight green colour is produced, and the older the corpse the more frequently are such ptomaines obtained.

Chlorine water to acid solution: Gelsemine yields yellowish turbidity and slight fluorescence; after a while a yellowish-white precipitate, which is produced yet in solutions of 1 in 1000 and is dark coloured from impure alkaloid; the supernatant liquid is not fluorescent. Strychnine has a very similar behaviour; likewise, though less delicate, quebrachine.

Boiling with perchloric acid: Gelsemine, slightly yellow; strychnine, red.

Sulphuric bihydrate, with fragment of potassium chlorate and boiling: Gelsemine and aspidospermine, clear; strychnine, red-brown to black-brown solution.

Selmi's reagent (iodic acid suspended in sulphuric acid): Gelsemine and strychnine, rose-coloured; brucine and aspidospermine, brick-red; quebrachine, dark violet. On warming, the colour becomes darker, and finally disappears.

Potassium-bismuth iodide gives a red-brown precipitate with ·000025 gram gelsemine; phosphomolybdic acid, a precipitate with the same amount. Precipitates with ·00005 gram gelsemine are caused by iodine, potassio-mercuric iodide, bromine (yellow), phosphotungstic acid (white), and tannin; with ·0001 gram gelsemine, by potassio-cadmic iodide (white) and picric acid (yellow), and a turbidity merely by the chlorides of gold and mercury.

The author then refers to the physiological experiments made with gelsemium by Professor Ott (1875) and Dr. Moritz (1878), with whose results his own observations agree. He details his experiments for th detection of

* Mix powdered picrotoxin with 3 or 5 parts of pure saltpetre; add 1 or 2 drops of strong sulphuric acid; mix, and add rapidly soda solution to strong alkaline reaction, when the mixture becomes transiently brick-red.—EDITOR *A. J. P.*

æsculin (gelsemic acid) and gelsemine, made with food, blood, and urine, both fresh and putrid, and with poisoned cats, and closes with the following deductions:

After poisoning with gelsemium in lethal doses, æsculin and gelsemine may be isolated by Dragendorff's method (removal of fat by petroleum benzin, extraction of æsculin from the acid solution by chloroform, and extraction of gelsemine from the alkaline liquid by benzol), and both may be recognized as such.

Æsculin may be found in all organs, and gelsemine in the stomach, intestines, blood, and liver.

After the subcutaneous application of rapidly fatal doses of gelsemine, the alkaloid can be detected in the corpse only in mere traces, and not with certainty; it is best to search for it in the liver.

Putrefaction, accompanied by alkaline reaction, does not alter gelsemine, but decomposes æsculin; both principles are not altered if the reaction remains acid.

The poisonous action of gelsemium does not depend on æsculin.

Gelsemine and æsculin rapidly pass from the stomach and intestines into the blood, and are excreted through the urine. The resorption is also rapid on subcutaneous application.

For the complete excretion of æsculin through the urine a longer time is required, so that after a single dose it may be recognized in the urine for several days.

If, in forensic analysis, gelsemine is supposed to have been found, the presence of æsculin should be determined for deciding the question whether gelsemine alone or gelsemium root had been administered.

Under certain conditions gelsemine shows the same reaction with sulphuric acid and potassium bichromate as strychnine. For distinguishing it from the latter, the following properties are useful:—

I. The reactions. 1. To concentrated sulphuric acid; 2. To sulphuric trihydrate and potassium bichromate (or ceric oxide or peroxide of manganese, or of lead); 3. To Brouardel-Boutmy's reagent; 4. To sugar and concentrated sulphuric acid.

II. The action upon the animal body; and

III. Its association in the root with æsculin.

It is distinguished from quebrachine, 1. By not being extracted by chloroform from acid solutions by the reactions; 2. With sulphuric acid and potassium trihydrate; 3. With Froehde's reagent; 4. With sulphuric acid containing iron; 5. By the absence of æsculin from quebracho bark.

The mode of isolation, the reaction with Froehde's reagent, and the association with æsculin in the drug serve to distinguish gelsemine from geissospermine.

For distinguishing it from aniline and curarine consult Dragendorff, 'Ermittelung der Gifte.' Relations analogous to those existing between strychnine on the one side and curarine and aniline on the other are likewise observed between gelsemine and the last two alkaloids.

PREPARATION OF ESSENCE OF RENNET FROM FRESH STOMACHS.*

BY DR. J. NESSLER.

In this paper the author communicates the results of some experiments made with the object of comparing the activity of essence of rennet made according to Soxhlet's method from dried stomachs† and that of essence made from fresh stomachs.

The experiment showed that, using corresponding quantities of dried and fresh stomach, the latter yielded the more active preparation. It was found, moreover, that the activity of the preparation from a fresh stomach could be increased by the removal of mucus, which not only made it more bulky, but prevented it from diffusing the milk so readily, and that this removal could be effected without injury by means of blotting paper. Preparations made from the top layer of the inside of the stomach, scraped off with a knife, proved much more active than others for which the residuum was used, but the residuum contained too much ferment to permit it to be left unused.

The author gives the following instructions for the preparation of an essence of rennet from fresh stomachs. Chop up a fresh calf's stomach as finely as possible, pour upon it two litres of water in which 100 grams of common salt has been dissolved, and shake well. After twelve hours add 200 c.c. of 90° alcohol, and allow the whole to stand, with frequent stirring, in a closed flask for three weeks, then decant, and add sufficient blotting paper to cover it. After several weeks, during which the vessel must be kept well closed, the essence of rennet is drawn off into bottles and preserved. A liquor prepared in this way was, when fresh, capable of curdling 6000 times its volume of milk, and, being kept in a well-corked bottle, it was found, after two years, to have diminished in activity only from 1 in 6000 to 1 in 5451.

The author adds that distilled or rain water gives a more active essence than spring water, and that it is advantageous to mince the stomach as finely as possible.

SOLAR APPARATUS.

It will be remembered that M. Mouchot, a short time ago,* devised an apparatus for utilization of solar heat, and that M. Pifre made some important improvements on it. Very different views have been taken as to the practical utility of such an apparatus. Some help towards a right judgment now comes from Montpellier, where a French Government Commission has been experimenting with the apparatus for a year (1881). Another commission has experimented at Constantine, in Algeria, but the results are not yet published. The apparatus was of the known form—a concave mirror, with blackened boiler in the axis, surrounded by a glass envelope. The steam from the boiling water was condensed in a coiled tube cooled by water. The weight of water distilled in an hour indicated the amount of heat utilized; and observations with an actinometer from hour to hour showed the amount of incident heat. The rates of these two quantities was a measure of the economic efficiency of the apparatus. The temperature and moisture of the air, etc., were also carefully noted. The number of days of observation was one hundred and seventy-seven, and of observations nine hundred and thirty, and water was distilled to the amount of 2725 litres. Without entering much into numerical detail, we may state that while the heat utilized in the most favourable circumstances per square metre per hour would be about equal to that utilized from 240 grams of coal (supposing about a half to be utilized)—even the half of this is not attainable in our climate. The sun does not shine continuously enough for practical utilization of the apparatus. In very dry and hot climates the possibility of utilization would depend on various circumstances, such as the degree of difficulty of procuring fuel, the price and facility of transport of solar apparatus, etc. We note in the report (by M. Crova) that the efficiency of the apparatus is not proportional to the heat intensity of the solar radiations, and hardly ever varies in the same sense. The absolute quantity of heat utilized, on the other hand, depends essentially on the temperature of the air; the higher this is, and the less consequently the cooling, the greater the amount of heat utilized.—*Times.*

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* *Pharmaceutische Zeitung*, July 15, Supplement.
† *Pharmaceutical Journal*, [3], ix., 307.

* See *Pharm. Journ.*, [3], vol. x., p. 1037.

The Pharmaceutical Journal.

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

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

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REPORT OF THE SCIENCE AND ART DEPARTMENT ON SCIENCE TEACHING.

THE twenty-ninth Report of the Science and Art Department shows that during the year 1881 the expenditure under that head amounted to £340,025 14*s.* 10*d.*, and that although the number of schools examined was rather less than in the year 1880 the number of persons under instruction at them was larger than in the previous year. The term "science school" is employed in a somewhat wide sense in the Report, as indicating each separate institution in which science is taught in connection with the Science and Art Department. The school may consist of but one class in a particular branch of science, meeting in the evening in an elementary school or some other building used for a different purpose during the day, or it may occupy a building or part of one belonging to the school with day and evening classes, and a more or less complete curriculum of studies in several branches of sciences. No very precise classification of the different kinds of schools established under the system of aid granted by the Department can be made, but the following statement furnishes a fair general idea. There are about 300 science schools which are held in buildings which are either entirely the property of the schools or in part definitely appropriated to them and these schools have every element of permanency. About 320 science schools are parts of or adjuncts to educational institutions of a character more extended and general in its scope. They may also be looked upon as of a permanent character and depending more on local organizations than on the teacher. In addition, there are some 580 schools or classes which depend more on the teachers through whose energy these schools have come into operation than upon any permanent local organization. They are usually superintended by committees, but are generally held in rooms hired for the purpose, and though they may have been in operation for many years, and would probably be continued, there is a possibility that by the death or removal of the teachers from any of them they might be in many cases closed. Lastly, there are about 260 classes of a more ephemeral character, a certain number of which come to an end every year, while others are commenced. It is found that they often lead to the establishment of permanent institutions for science teaching, but even where this has not been the case these schools have been productive of good while they lasted.

The number of separate classes examined in 1881 was 4839, and the number of students who came up for examination from them was 38,837. In addition there were 5804 self-taught students and pupils in classes not entitled to claim payment on results. The number of papers which passed was rather larger than in the previous year, and the number of candidates in the honours division of the examination was 1342, of which 91 passed in the first class, and 395 in the second class.

It is considered that the general reports of the examiners give a favourable impression of the progress of the schools, but on referring to the published extracts from the examiners' reports it is not difficult to perceive that bad teaching is still too prevalent and that there is much reason for suspecting the existence of a cramming system, designed only to secure the benefit arising from success in the examinations. This is especially pointed to in the reports of Professors HUXLEY and GUTHRIE, Dr. MICHAEL FOSTER, Dr. RUSSELL and Mr. THISELTON DYER, and the circumstance appears to have been regarded as so obviously suggestive of a want of proper qualification on the part of the certificated science teachers that Colonel DONNELLY devotes considerable space to a kind of apology for the defects of the teachers. He seeks to answer the constantly repeated criticism of the action of the Department that it does not demand a higher qualification from the teacher before he is allowed to teach by pointing out that the Department does not give any certificate of qualification to teach, but merely states that a certain person, having passed a certain examination, is qualified according to the rules to earn payments on the results of his instruction as measured by examinations. This is scarcely a satisfactory answer, especially when it is remembered that Colonel DONNELLY does not dispute the existence of much bad teaching. It is discouraging to find this virtual admission that a vicious system is being propagated throughout the country, instead of that thorough study of subjects which can alone justify support by the State and the large expenditure that is incurred.

There can indeed be little doubt in the mind of anyone conversant with the past action of the Department, that certificates of qualification to teach various subjects are granted too readily and upon insufficient grounds and that much harm is being done in this way. Colonel DONNELLY, indeed, mentions a circumstance which appears to illustrate this point and to show that, in spite of the admirable body of distinguished men of science acting as examiners, there is a tendency, even among highly trained and good teachers, to make

the passing of the examinations the chief object of their work rather than the sound instruction of their pupils. No doubt the power to teach is to a great extent a special faculty, distinct from the power to learn and to pass an examination, but that is not a sufficient reason for granting certificates of qualification to teach without applying some test by which the possession of the teaching faculty can be ascertained, and it is a fact that points in the opposite direction. We are inclined to believe that, under existing conditions, it does pay to prepare students for defeating examiners, and that the efforts made in this direction are only too successful. It may be a satisfaction to know that those who fail to do so do not obtain any State money, but it is not the less certain that infinite mischief is done by those who succeed.

The number of centres at which examinations were held last year was in the provinces 987 and in the metropolis 111. The total amount paid to teachers on results was £43,519 2*s.* 9*d.*, or at the rate of 14*s.* 2*d.* for each student under instruction. These payments were made to 1762 teachers, and the average payment per teacher was £24 13*s.* 11*d.* But there was a very great inequality in the amounts of payment to schools, as will be evident from one or two instances taken at random from the returns. Thus, an orphan school at Stockport presented one hundred students for examination in seven subjects, with the result that payment was made amounting to £301, or rather over £3 per head of the children. Another school at Warrington, presenting the same number for examination, only obtained £27. Another school in Bristol presenting one hundred and eighteen for examination in fourteen subjects gained £413. Hence it is evident that this system may be worked in such a way as to form a very considerable addition to the income of a school, and it becomes very important to guard against the possibility of this being effected by such means as we know examiners are very generally coming to acknowledge that they cannot adequately deal with.

During the past year the grants towards purchases of apparatus, diagrams and examples amounted to £497 13*s.* 2*d.*, being a decrease of more than £210 on the previous year. At the Normal School of Science and Royal School of Mines there were last year 46 regular and 139 occasional students. At the Royal College of Science for Ireland there were 16 regular and 20 occasional students. The lectures at South Kensington Museum were attended by 3788 persons. The evening lectures to working men at the Royal School of Mines were attended by 1472 persons, or 328 less than last year, and 211 science teachers attended the special courses of lectures provided for their instruction in the new science schools at South Kensington. The lectures in connection with the Department in Dublin were attended by about 850 persons. Therefore, the total number of persons who received instruction as students, or by means of lectures, in connection with the Science and Art Department in 1881 was 984,820, showing an increase as compared with the previous year of nearly 9 per cent.

THE CONFERENCE MEETING.

On Tuesday next, as most of our readers are aware, the Nineteenth Annual Meeting of the British Pharmaceutical Conference will commence in Southampton, and it may be convenient for some intending visitors to have a brief recapitulation of the programme of the proceedings, so far as it has been made known. The sittings are to be held in the Watts Memorial Hall, on Tuesday the 22nd and Wednesday the 23rd inst., commencing at 10.30 a.m. each day. At 1 p.m. on each day there will be an adjournment until 2.30 p.m., for the purpose of luncheon, and the business proceedings will terminate about 5 p.m. on Wednesday. On Thursday the visitors are invited by the members of the Local Committee to accompany them upon an excursion to the Isle of Wight, visiting Ryde, Ventnor, Brading and the Landslip.

Last week we were enabled, by the courtesy of the Honorary Secretaries, to print a list of papers that have been received or promised for reading, subject to the approval of the Executive Committee. To these are now added—

22. Note on a Reaction of Glycerine and other Polyhydric Alcohols. By W. R. Dunstan, F.C.S.

23. On Tumefaction as an Aid to the Identification of the Varieties of Maranta Starch. By W. H. Symons, F.R.M.S., F.C.S.

Although rather late, it may be useful to repeat that information respecting hotel accommodation and similar matters will be willingly given to intending visitors by the Honorary Local Secretary, Mr. O. R. Dawson, Belle Vue Road, Southampton.

The meeting, in the same town, of the British Association, under the Presidency of Dr. C. W. Siemens, promises this year to be a very interesting one, and as is usually the case will induce many of the visitors to the Pharmaceutical Conference to prolong their stay for some days more.

A NEW PHARMACOPŒIA FOR GREECE.

We learn from an esteemed correspondent, Professor Xavier Landerer, of Athens, that a Commission has just been entrusted by the Government with the task of elaborating a new Greek Pharmacopœia. The first official Greek Pharmacopœia made its appearance in the year 1837, and was compiled by John Bouros, Xavier Landerer and Josef Sartorios. In 1868, this work was reprinted, with an Appendix, by Professor Landerer, describing the more recent remedies and containing an etymological dictionary of names of botanical, zoological and mineral substances, and a list of antidotes. This work is still in common use throughout Greece, as well as in Asia Minor, and also to some extent in Constantinople; but in Turkey Dorvault's *L'Officine* is the work usually consulted.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, August 2, in the College of Physicians, Kildare Street, at three o'clock.

The President, Professor Charles Tichborne, in the chair.

The other members present were:—The Vice-President, Dr. Aquilla Smith, and Messrs. Allen, Bennett, Brunker, Dr. Collins, Messrs. Doran, Draper, Grindley, Hodgson, Sir George Owens, Messrs. Payne, Pring, Simpson, Dr. Whittaker, Messrs. Lester and Wells.

Mr. Hugh Fennell, Registrar, read the minutes of the last meetings, which were confirmed.

The President congratulated the meeting on the presence, for the first time amongst them, of two newly elected members of the Council, Mr. Lester and Mr. Wells.

The first business on the paper was the election of an Examiner in Practical Pharmacy. There were two candidates.

Dr. Collins moved that—

"Mr. Charles Evans, M.P.S.I., be elected."

Mr. Draper seconded the motion.

Mr. Allen moved that—

"Dr. William Whitla, L.A.H.I., M.P.S.I., be elected."

Mr. Pring seconded the motion.

Dr. Whittaker hoped that by this election the Council would show that they were desirous of making the Society a national and not a metropolitan society. They had already three examiners belonging to Dublin. Dr. Whitla, besides being thoroughly conversant with practical pharmacy, had published a book. He had been in his (Dr. Whittaker's) establishment for years. He did not know Mr. Evans personally, but he wished he had some higher qualification than being a member of the Pharmaceutical Society of Ireland. Excuse him, he would say that it was not a very high qualification, although he hoped it would yet become such. [Certain members of the Council protested against Dr. Whittaker's remarks.] The Belfast members had tried to do all they could for the Society. There was no doubt as to Dr. Whitla's qualifications, and his being a medical man was rather in his favour than otherwise.

Dr. Collins said it was to carry out the principle mentioned of making the Society as much a national one as possible, that Sir George Owens and himself had wished to elect Mr. Harrington, of Cork, at the previous meeting.

The President said he had received a letter in reference to the election, in favour of Mr. Evans, from a member of the Council, who was unable to attend, and he thought he should read it.

Mr. Draper did not think such a letter ought to be read.

The Vice-President said if a member could not make it his convenience to attend the election he had no right to have his letter read.

Mr. Draper said he made the objection not knowing who the writer was.

The President: It is Mr. Hayes.

The Vice-President observed, that as both candidates were members of the Pharmaceutical Society, he did not think any disrespect was involved in the observation made by Dr. Whittaker. He was aware that Dr. Whitla had produced a work on pharmacy, which possessed a great deal of merit. He was not personally acquainted with Mr. Evans, but he knew that he represented the oldest compounding establishment in the city, which was at present more than a century old; and if there had been no other candidate he would vote for him, as he was sure he would make a very suitable examiner. He quite concurred in the observation that the examiners should not be exclusively Dublin men.

Mr. Payne, in supporting the candidature of Dr. Whitla, said that gentleman was a thoroughly practical man, and in addition to being a pharmaceutical chemist was an apothecary. He thought all the members of the Council would admit that in past times the apothecaries had conducted pharmacy in a satisfactory manner. One of the strongest points in his favour was that he in no way prepared pupils for examination in the city. He was sure no examiner would wish to examine his own pupils. No member of the Council who prepared pupils should be an examiner.

Sir George Owens said Mr. Evans was fully equal to the post he sought, and he could vouch for him that after he should be elected he would never take or teach a pupil in the city.

Mr. Draper said he never had the faintest idea that Mr. Evans took pupils. If he thought he did he should withdraw his support from him.

Mr. Payne said he thought the Registrar had a certificate from Mr. Evans.

Mr. Fennell said it was a certificate from Dr. John Evans, of having been engaged in compounding in his establishment for two years.

The President said he could contradict the imputation that Mr. Evans took private pupils. The certificate referred to was that of a Mr. Hardy, who went to Mr. Evans's brother to put in two years' pharmacy.

Dr. Montgomery said the taking of apprentices was not the same thing as grinding, and it rather added to Mr. Evans's ability to be a good examiner.

The President said it was not necessary to carry the discussion further. He merely wished to say that he knew both of the candidates, and they were both excellently qualified. He should be very glad to have Dr. Whitla as an examiner in materia medica, which was the subject on which he had written, but in the present instance he thought Mr. Evans would be the right man in the right place. He was a properly educated pharmaceutical chemist, and practically engaged in compounding; Dr. Whitla was a practising physician.

The Council then divided on the motion for the election of Mr. Evans with the following result:—

For the motion—Sir George Owens, Dr. Montgomery, Messrs. Hodgson, Brunker, Draper, Lester, Doran, Bennett, Dr. Collins and the President,—10.

Against it—Dr. Whittaker, Messrs. Allen, Pring, Simpson, Grindley, Wells, Payne, and the Vice-President,—8.

The President declared Mr. Evans duly elected.

The Registrar read a letter from Mr. George A. Webb, of 141, York Street, Belfast, stating that he was surprised at seeing it reported in the proceedings of the Council that a member had said that he (Mr. Webb) stated that while Mr. Carse was in his establishment he attended "pretty regularly." He had no recollection of having used such words. On the contrary, while Mr. Carse was with him his attendance was regular, and he exceeded his time by six weeks.

Mr. Payne said it was possible that he had made a mistake in using the words "pretty regularly."

The Registrar read a letter from a member of the Society in Waterford, protesting against Mr. Savage, of Dublin, being allowed to keep an open establishment for compounding in that city, even by means of a qualified assistant.

Mr. Brunker said this matter was considered at a former meeting of the Council, and the explanation then given by the representative of the late Mr. Savage was deemed satisfactory. The deceased Mr. Savage was an apothecary, and his executor was carrying on his business with the aid of a qualified assistant. The Council could not interfere in the case, and if the writer of the letter had anything to complain of he should apply to the Apothecaries' Hall.

The President said the proper reply would be to say that the case has been already considered, and that

there was no information before the Council at present that would warrant interference.

Mr. Brunker said he would go further to say that the Council had no power to interfere under clause 32.

The Vice-President: There might be a hundred shops kept open in the same way. There should be some limit to it. Clause 32 did not put any limit to the time during which an establishment might be kept open by a hired assistant, and was therefore defective.

Mr. Brunker said clause 32 did not apply to a licensed apothecary.

Dr. Whittaker asked whether a lady had not been carrying on one of the first businesses in Dublin for years?

The President:—But she engaged a qualified man. She is the widow of an apothecary.

The Vice-President asked whether the deceased in the present case was a registered pharmaceutical chemist.

Mr. Brunker: No; an apothecary.

Dr. Collins said the Council had always allowed executors to carry on the business of deceased members of the Society by a suitable person and for a moderate time while they could dispose of the interests, but he did not think they had been allowed to go on as this man was doing. Still, if either this Society or the Apothecaries' Hall brought him into a court of justice the probability was that clause 32 would be relied on, even for an apothecary's executor.

The Vice-President said a legal opinion on the case ought to be taken.

On the motion of Mr. Payne the letter was referred to the Law Committee with instruction to take a legal opinion on it; and the Registrar was directed to inform the writer of the course which had been taken.

A letter was received from Dr. Stannus Hughes, Registrar of the College of Surgeons, intimating that as soon as the Council of the College had before them the amendments which the Council of the Pharmaceutical Society proposed to have made in the Sale of Poisons Act, they would take them into consideration.

On the motion of Mr. Bennett, seconded by Mr. Doran, a report of the Law Committee was adopted.

Mr. Allen moved the following resolution:—

"That for the use of the Examiner in Pharmacy a collection of prescriptions shall be formed, which shall be pasted in a book, or books, and placed, when not in use, under the care of the Registrar, and treated as confidential."

He would be glad to see the examination of the Society made very much better. It was rather under the standard of the Minor examination in England, and he should be glad to see it brought up to it. The English Pharmaceutical Society had a collection of 3000 prescriptions, got together by Mr. Joseph Ince, which included every variety of writing and different styles of Latin.

Mr. Pring seconded the motion.

Dr. Whittaker said he would not oppose the motion, but he thought it unfortunate that it should be called for. The motion of Mr. Allen was almost absurd on the face of it. He (Dr. Whittaker) would know what practical information a man possessed almost as soon as he saw him take a pestle in his hand. Botany and chemistry and materia medica were all very well, and yet there were practical pharmacists who knew mighty little about these things and yet could read prescriptions well and do their work well.

Dr. Collins was of opinion that it would be desirable to have such a collection of prescriptions as was proposed by Mr. Allen. It would be an advantage for the examiner to have other prescriptions besides his own.

The President said he agreed with Dr. Collins. It would be easy for the candidates to get prescriptions which had been written by the Examiner. A large variety would afford a much more effectual test. Besides, Mr. Allen did not want to dictate to the examiners. They could write prescriptions themselves also.

Dr. Montgomery said he believed Mr. Allen did not intend to interfere with the examiners. He (Dr. Montgomery) had had a large experience as an examiner and when conducting an examination he always selected from a collection of from 300 to 400 prescriptions.

Mr. Payne was in favour of the collection of prescriptions. It should embrace prescriptions written in every part of Ireland.

The motion was then put and carried unanimously.

Mr. Allen said that in order to carry out the resolution just passed it was necessary for him to move:—

"That the members of the Society be invited to send prescriptions and that the committee appointed to visit the examinations shall receive, examine, and arrange the collection."

Mr. Pring seconded the motion, which was unanimously agreed to.

The Registrar stated that he had received a letter from Mr. A. Chapman, pharmaceutical chemist, of Belfast, forwarding one which he (Mr. Chapman) had received from Dr. Meredith and Dr. Dunne, the secretaries of the Royal University, informing him that a certificate signed by a licentiate apothecary attached to a recognized hospital would be accepted by that university. Mr. Chapman asked the Registrar (Mr. Fennell) was it only a licensed apothecary that could give a certificate which would be accepted by the Royal University.

Dr. Whittaker said the Council should ask the Royal University to recognize their licentiates as competent to give certificates in pharmacy. He moved that the attention of the authorities of the Royal University be called to the fact that as far as regards the compounding of medicines the privileges of the Apothecaries' Hall had been united with those of the Society, and that pharmaceutical chemists were qualified by law to compound medicines, and that the Council should ask the authorities of the Royal University to accept the certificates of qualified members of the Society as on a par with those of members of the Apothecaries' Hall.

The President said that as the subject was not on the paper of business it was better to give a notice of motion respecting it.

The Registrar laid on the table the report of the examiners.

Mr. Brunker, as one of the visitors who had attended the examination, said that the candidates were of a good stamp, but he thought the arrangements made for the holding of the examination most unsatisfactory. The time given to the examiners was also insufficient. They would like to have two days, one for papers and one for *vivâ voce*.

The President said he had directed Mr. Fennell to supply the examiners with everything that they required.

On the motion of Dr. Whittaker, seconded by Mr. Hodgson, the consideration of the recommendations of the Pharmacy Act Amendment Committee was postponed.

Mr. Payne said he had to hand in his resignation. He could not remain on the Council when it was the opinion of some members that three weeks was a sufficient time to learn compounding in, and when the Council had endorsed that view by the course which it had that day taken with respect to the election of the examiner.

Mr. Brunker trusted that the Council would not receive Mr. Payne's resignation. He was sure that when Mr. Payne thought over the subject he would see that it was scarcely wise to retire merely because everything was not done according to his own ideas. If everyone did that they would have no Council.

Dr. Whittaker also handed in his resignation. He said he did so with regret, but he did not believe that he could do any good by remaining. He was afraid he was

not met in the spirit in which he should be met, having regard to the services which he had rendered to pharmacy. He believed they wished to make the Society a Dublin Society.

The President said he thought Dr. Whittaker was hardly justified in in saying that, when four members of the Society from Belfast had been put on the Council, which numbered, in all, only twenty-one members, and having regard to his (President's) anxiety to get the North of Ireland represented on that Council. Dr. Whitla, it was true, had resigned, but he was sure that they would all be glad of the first opportunity of seeing him back again.

Dr. Whittaker said he merely believed that what he had stated was the case.

Mr. Pring said that he had been disappointed at the result of the election, as well as Mr. Payne and Dr. Whittaker. But they had been fairly beaten, and, therefore, they should not resign. But there were one or two notices of motion to come on with respect to the bye-laws and if these should not be carried, he (Mr. Pring) would resign.

Mr. Brunker said that five Dublin members of the Council had voted for Dr. Whitla; while two country members had voted for Mr. Evans.

The President said he would not accept the resignations. If the gentlemen desired to resign, they could, after good consideration, forward their resignations to him.

The Council then adjourned.

Provincial Transactions.

CHEMISTS' AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Executive Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on August 9, 1882, at 1 p.m.

Mr. Robert Hampson (London), President, in the chair.

Mr. John Harrison (Sunderland), Vice-President.

Present—Messrs. Arblaster (Birmingham), Barclay (Birmingham), Bell (Hull), Churchill (Birmingham), Cross (Shrewsbury), Davis (Leamington), Ellinor (Sheffield), Holdsworth (Birmingham), Jones (Llanrwst), Laird (Edinburgh), Maltby (Lincoln), Mason (Liverpool), Parker (Nottingham), Paterson (Aberdeen), and the Solicitor of the Association.

Communications were read from Messrs. Mackenzie, Stead, Walker, and Williams, regretting their inability to attend.

The minutes of the previous meeting of the Executive were read and confirmed.

It was moved by Mr. Laird, seconded by Mr. Ellinor, and unanimously resolved:—"That the officers of the Association, together with Messrs. Andrews, Arblaster, Barclay, Bell, Cross, Davis, Jervis, Holdsworth, Maltby, Mason, Stead, Symes and Walker form a Law and Parliamentary Committee for the ensuing year."

It was moved by Mr. Cross, seconded by Mr. Mason, and unanimously resolved:—"That the officers of the Association, together with Messrs. Arblaster, Barclay and Holdsworth, form a Finance Committee for the ensuing year."

It was moved by Mr. Bell, seconded by Mr. Paterson, and unanimously resolved:—"That the officers of the Association, together with Messrs. Andrews, Arblaster, Bell, Cross, Davis, Jervis, Ellinor, Holdsworth, Jones, Maltby, Mason, Parker, Stead, Symes, Walker and Williams form a General Purposes Committee for the ensuing year."

It was moved by Mr. Cross, seconded by Mr. Davis, and unanimously resolved:—"That Mr. Henry Glaisyer be re-appointed Solicitor to the Association for the ensuing year."

It was moved by Mr. Bell, seconded by Mr. Harrison, and unanimously resolved:—"That Mr. W. F. Haydon be re-appointed Secretary to the Association on the same terms as before."

It was moved by Mr. Bell, seconded by Mr. Ellinor, and unanimously resolved:—"That Professor Attfield be re-appointed Analytical Referee to the Association for the ensuing year."

It was moved by Mr. Mason, seconded by Mr. Arblaster, and unanimously resolved:—"That Messrs. Lloyd's Banking Company be re-appointed Bankers to the Association for the ensuing year."

It was moved by Mr. Cross, seconded by Mr. Davis, and unanimously resolved:—"That Messrs. Laundy and Co., Public Accountants, be re-appointed Auditors to the Association for the ensuing year."

Mr. Paterson said that he thought the Assistant Secretary might make a journey to Scotland with a view of taking proceedings against unregistered traders under the Pharmacy Act.

The Secretary said that in May last, he had written to the Honorary Secretary of the Scottish Branch of the Association, asking to be supplied with the names of a few unregistered traders, residing in Scotland, who were openly selling arsenical sheep dip, but that he had not yet received such a list.

On the suggestion of Mr. Barclay, the Secretary was instructed to again write to the Secretary of the Scottish Branch respecting his (the Secretary's) former application.

The Secretary said that some months since, it had come to the knowledge of the Committee of the Scottish Branch of the Association that an application was about to be made by the Edinburgh University Court to Her Majesty in Council, for powers to make attendance in practical classes in physiology, pathology, and materia medica imperative, and that the instruction accepted as equivalent to a course of practical materia medica be apprenticeship for not less than two years in compounding and dispensing drugs under a registered medical practitioner or a member of the Pharmaceutical Society of Great Britain. This ordinance would have precluded chemists and druggists who were not members of the Pharmaceutical Society from educating students in materia medica. A memorial was consequently transmitted to the Secretary of the University Court on the subject, to which memorial the faculty of medicine had replied as follows:—"The memorial of the Scottish Branch of the Chemists and Druggists' Trade Association urges that a certificate of two years' apprenticeship with a registered chemist and druggist should be received by the University as equivalent to a certificate of apprenticeship for a similar period with a member of the Pharmaceutical Society of Great Britain. The faculty of medicine, only after some hesitation, included the latter among the means of instruction alternative to a recognized class of practical materia medica, on the ground that a certain number, which can only be a small one, of candidates for degrees in medicine may, in the laboratory of a pharmacist, have acquired practical instruction in many of the subjects taught in this class, at a time when they did not contemplate qualifying themselves for the profession of medicine. It appeared unnecessary to require such students to attend a class of practical materia medica, even although the instruction in this class would be of a more systematic, wide, and academic character than in the establishment of a pharmacist. It was recommended that apprenticeship should be restricted to a member of the Pharmaceutical Society of Great Britain, because the fact of such membership affords a guarantee that an education had been undergone which renders the members of this Society in many respects qualified to give such instruction to their apprentices as a university might be justified in recognizing. The education of registered chemists and druggists is, however, of the most varying description, and the title fails to afford a guarantee of equal value to the title of member of the Pharmaceu-

tical Society of Great Britain. At the same time, taking into consideration the fact that the alternative qualification of apprenticeship to a pharmacist would affect only a limited number of students, and that the class of students so affected would generally be one whose pecuniary resources are limited, the faculty of medicine would be willing to coincide in the suggestion of the Chemists and Druggists' Trade Association. The University Court consider it desirable to adopt it."

The Executive considered in committee the advisability of defending a member of the Association against whom an action was threatened for the alleged infringement of a trade mark for liver mixture, and decided to defend on the grounds that the words liver mixture had been for many years of common use in the trade, and that it was not advisable in the interest of the trade that any person or firm should claim a monopoly over such common terms.

The President said that the next subject on the agenda paper was:—"To consider the advisability of giving effect to the following resolution, passed by the Executive at their last meeting:—'That it be a recommendation to the incoming Executive to communicate with the Government on the question of the sale of patent medicines containing scheduled poisons.'" The discussion on this matter was also taken in committee.

It was moved by Mr. Barclay, seconded by Mr. Holdsworth:—"That a deputation be appointed by the Executive to wait upon the Government to ask that the sale of patent medicines containing scheduled poisons may be put under the same regulations as the sale of other scheduled poisons," to which Mr. Paterson moved, as an amendment, and Mr Bell seconded, "The previous question."

On being put to the vote, 10 voted for the amendment and 4 against it; it was consequently carried.

On the motion of Mr. Barclay, seconded by Mr. Jones, it was resolved:—"That the Finance Committtee be authorized to appoint local secretaries in all towns in England and Wales containing six or more chemists and druggists, and that the same Committee be empowered in conjunction with the Scotch Committee of the Association to appoint local secretaries in Scotland."

Several communications were read from members of the Association, and the Secretary was instructed as to the manner in which he should deal with the same.

DOVER CHEMISTS' ASSOCIATION.

At a meeting of the above Association the following note was read:—

A Dispensing Solution of Acetate of Potash.

BY J. F. BROWN.

From its proneness to deliquescence, this salt often gives trouble to the dispenser; and I thought it might be worth while to suggest the following formula for a dispensing solution, which is easily made, permanent, and of convenient strength.

Weigh into an evaporating dish half a pound (av.) and 68 grains of acetic acid, B.P.; then add in successive portions 3¾ ounces, or quant. suff., potassium carbonate, until the solution, having been gently heated to expel carbonic acid, is neutral to test paper; evaporate further if needful, to make the measure exactly 8 fluid ounces, and filter. Two minims contain 1 grain. A fluid drachm contains 30 grains and a fluid ounce 240 grains.

Proceedings of Scientific Societies.

KENTUCKY PHARMACEUTICAL ASSOCIATION.

Some New Preparations of the Hypophosphites containing Iron.*

BY C. LEWIS DIEHL.

Several years ago I was requested by a physician to prepare for one of his patients a pleasant combination of the hypophosphites of iron and quinia, if possible, in the form of an elixir, and in as nearly a neutral condition as practicable. After some experiments I succeeded in making a very acceptable preparation—in fact, an elegant elixir, containing in each fluid drachm one grain of each of the salts named, in perfectly neutral combination. The successful production of this preparation led me to apply the chemical facts involved to the production of other combinations of hypophosphites containing iron, some of which have been received with decided favour by the physicians whose attention I have been able to invite to them. Thinking that possibly these preparations may merit more extended use, and that at all events they are interesting combinations, I have concluded to make known their formulas and the methods of their preparation in the following.

In the preparations prepared by me the ferric salt is used, as in Professor Procter's formula,* but instead of effecting its solution by means of hypophosphorous acid, citrate of potassium is employed, a handsome greenish and perfectly neutral solution being formed. The quantity of the citrate necessary for this purpose is about equal to that of the dry ferric salt, but the latter is preferably prepared freshly and dissolved while still moist. The citrates of ammonia or sodium would answer the purpose of solvent as well as the potassium salt, which was selected only because it is always at hand, and because the ammonium and sodium salts are not known to possess any advantage. For the preparation of the ferric hypophosphite any of the soluble salts of the hypophosphorous acid will answer, but I have selected the hypophosphite of calcium, with ferric chloride as precipitant, for the reason that it is the salt most commonly kept in quantities, and because it is the cheapest. Certain precautions must, however, be observed to secure the perfect precipitation of ferric hypophosphite, for if too much or an insufficient quantity of ferric chloride be added, a portion of hypophosphite remains in solution and is lost during the washing of the precipitate, which must be done with the smallest possible quantity of water. It may be well, therefore, to give particular consideration to the

Preparation of the Ferric Hypophosphite.—Dissolve 150 grains of the hypophosphite of calcium in four fluid ounces of distilled water, if necessary, by the aid of gentle heat, and filter the solution. To the cold solution carefully add solution of ferric chloride so long as a precipitate is produced. Collect the precipitate upon a close muslin cloth, drain well, and express firmly; then pour upon the magma one fluid ounce of distilled water, and express again. The magma may then at once be dissolved by the aid of citrate of potassium.

When precipitating this compound it is best to add the ferric chloride in small portions at a time and to stir the liquid constantly. Then allow the precipitate to subside, so that the supernatant liquid may become clear before adding the next portion of ferric chloride. Toward the last a small portion of the clear supernatant liquid is removed after each addition and tested with diluted ferric chloride solution, allowing it to stand for several minutes if no immediate turbidity occurs. If the liquid remains clear after several minutes' standing, the precipitation may be regarded as complete, and the straining and washing may go on as above directed. The product is equal to 128 grains of dry ferric hypophosphite.

Having thus explicitly given the method of obtaining the magma of ferric hypophosphite, these directions do not need repetition in the formulas for the different preparations given below. As regards its solution by the aid of citrate of potassium, it is only necessary to triturate the magma with the specified quantity of the latter, when partial solution will occur, and complete solution follows upon the addition of water, or of the solution of the other hypophosphites.

I. *Improved Syrup of the Hypophosphites with Iron.*—Take of hypophosphite of calcium 256 grains; hypophos-

* Read at a meeting of the Kentucky Pharmaceutical Association.

* Parrish's 'Pharmacy,' third edition, 1864, pp. 429, 430.

phite of sodium 192 grains; hypophosphite of potassium, 128 grains; ferric hypophosphite (represented in the magma obtained from 128 grains of hypophosphite of calcium), 96 grains; citrate of potassium, 96 grains; white sugar 13 troy ounces; orange flower water, 1 fluid ounce; distilled water, a sufficiency. Dissolve the calcium, sodium, and potassium hypophosphites in 7 fluid ounces of the water, if necessary, by the aid of a gentle heat, and filter the solution. Triturate the magma of the ferric hypophosphite with the citrate of potassium, add the solution of the other hypophosphites, and when complete solution is effected, the orange flower water and sufficient distilled water to make the whole measure 9 fluid ounces. In this dissolve the white sugar, without heat, and filter the resulting syrup through paper. A fluid drachm of this syrup contains 2 grains of the calcium, a grain and a half of the sodium, one grain of the potassium, and three-fourths of a grain of the ferric hypophosphite.

II. *Syrup of Hypophosphite of Iron.*—Dissolve 128 grains of ferric hypophosphite (represented in the magma) from 150 grains of hypophosphite of calcium, by the aid of 128 grains of citrate of potassium, in 1 fluid ounce of orange flower water, and sufficient distilled water to make the solution measure nine fluid ounces. In this dissolve 13 troy ounces of white sugar, and filter the resulting syrup. One fluid drachm of this syrup contains one grain of the ferric hypophosphite.

III. *Elixir of Hypophosphite of Iron.*—In the 9 fluid ounces of solution of ferric hypophosphite, obtained as above (II.), dissolve 4 troy ounces of white sugar, and add 5 fluid ounces of alcohol, in which 8 drops of fresh oil of orange have been previously dissolved; then filter. The strength of this is the same as that of the syrup, over which it probably possesses no advantage.

IV. *Elixir of Hypophosphite of Iron and Quinine.*—Make a solution of ferric hypophosphite, as under II., but bring it only to the measure of 7 fluid ounces, and dissolve 4 troy ounces of white sugar in it. Triturate 128 grains of sulphate of quinine with 5 fluid ounces of strong alcohol, add a solution of 30 grains of hypophosphite of calcium in $\frac{1}{2}$ fluid ounce of distilled water, and shake the mixture occasionally for an hour. Then filter, and wash the filter with sufficient strong alcohol to make the filtrate measure 7 fluid ounces. In this dissolve 8 drops of fresh oil of orange, add it to the solution of ferric hypophosphite, mix well and filter. A fluid drachm of this elixir contains 1 grain of the hypophosphite of quinine and 1 grain of ferric hypophosphite.

V. *Elixir of Hypophosphite of Iron, Quinine and Strychnia.*—This is the above elixir (IV.) containing $\frac{1}{128}$ grain of hypophosphite of strychnia in the fluid drachm, and is made by triturating 1 grain of sulphate of strychnia with the sulphate of quinine and alcohol, and increasing the quantity of hypophosphite of calcium by 1 grain.

VI. *Elixir of Calisaya with Hypophosphites.*—This is the "elixir of calisaya" proposed by me in 1866, containing hypophosphites in such proportion that two teaspoonfuls represent one teaspoonful of "improved syrup of the hypophosphites with iron" (I). It is therefore necessary to reproduce the formula for the elixir of calisaya, as modified for this purpose.

Take of calisaya bark, 24 troy ounces; curaçoa orange peel, 16 troy ounces; coriander, 4 troy ounces; cinnamon, 3 troy ounces; cardamom, $1\frac{1}{2}$ troy ounces; anise seed, 1 troy ounce; cocoa (Baker's), 8 troy ounces. Having reduced these ingredients to a moderately fine powder, displace them with a mixture of one volume of strong alcohol and three volumes of distilled water, until 2 gallons of percolate are obtained.

Meanwhile prepare from 6 pints of solution of tersulphate of iron, hydrated sesquioxide of iron by the formula of the Pharmacopœia, measure the magma, and add to every 4 volumes 1 volume of strong alcohol; then add of this mixture sufficient to the percolate, obtained as above, to deprive it of its cinchotannic acid. The absence of he latter is readily ascertained by the addition of a drop of muriated tincture of iron to a filtered portion of the liquid, which should not be coloured by such addition. Should coloration result, the intensity or faintness will serve as a guide to the further addition of the ferric oxide. As soon as de-tannation is effected, filter the whole through a *double* muslin cloth, express the residue under a press, filter this portion, add to that first obtained, and measure the united filtrate. Add to the residual magma on the cloth sufficient of the above described mixture of alcohol and water to make, when again expressed and filtered, the united filtrates measure 3 gallons. Now triturate 2 fluid drachms of fresh oil of orange with 4 troy ounces of prepared chalk, incorporate this with the 3 gallons of de-tannated "cinchona liquor," and agitate occasionally for twenty-four hours, and then filter.

The "cinchona liquor" so obtained is just twice the strength of the "elixir of calisaya," above referred to, and when mixed with an equal volume of "improved syrup of the hypophosphites with iron" forms the "elixir of calisaya with hypophosphites."

VII. *Elixir of Calisaya and Hypophosphites with Strychnia* may be made by dissolving 1 grain of strychnia by the aid of a few drops (or just sufficient) of hypophosphorous acid in one fluid drachm of distilled water, and adding sufficient of the above elixir (VI.) to make 1 pint A dessertspoonful contains 1·64 grain of strychnia.

Parliamentary and Law Proceedings.

Poisoning by Opium.

On Wednesday, August 9, an inquest was held at Millfield, Sunderland, upon the body of Dr. Joseph Parker Crossby, aged 44 years, medical officer of the Sunderland Workhouse, who was found dead in bed on Monday morning.

Mrs. Crossby testified that the deceased, who slept alone, was in the habit of taking morphia pills at night. He had complained of heart disease for years. He appeared all right on Sunday.

Dr. Drinkwater said he met Dr. Crossby (who had given evidence in a manslaughter case at Durham Assizes on Saturday) coming from the Workhouse on Saturday night. He was very much excited, nervous and shaky. When he was hastily called in on Monday morning, he judged deceased had been dead two hours. In his opinion death arose from an overdose of opium, but there was no indication of an intentional poisoning.

The jury returned a verdict in accordance with this testimony.

Important Excise Prosecution.

At the Lambeth Police Court on Tuesday, Mr. W. Bush, wholesale chemist, Artillery Lane, City, and Ash Grove, Hackney, appeared to summonses issued against him by the Inland Revenue for having, as alleged, used a still without a licence for compounding spirits, and for retailing spirits without a licence, and for separating gum resin from methylated spirits mixed with gum resin.

Mr. N. J. Highmore, barrister, prosecuted on behalf of the Inland Revenue; and Mr. Edward Pollock appeared for the defendant.

Mr. Highmore said he would take first the offence of "using a still" and "for separating gum resin from methylated spirits mixed with gum resin."

He called Mr. R. W. Parry, supervisor of Excise, who said he visited the premises of the defendant in Hackney. The ordinary still licence was produced. The defendant had no licence to distil spirits. Witness found six stills, varying from 30 to 1000 gallons. There were likewise three or four smaller stills. He found methylated spirit running from the worm end of some of the stills. He asked

a man what they were distilling, and he replied "A varnish or finish." A Mr. Wooton told him the same, and that the operation was performed in order to rectify the spirit from the gum. He took samples and handed them to the analyst at Somerset House. Witness made a search, and close to the stills found ten drums containing 110 gallons of methylated spirit, from which the gum resin had been extracted by the stills at work. On July 28, he again called in conjunction with Mr. Harper, who had been with him on the first day. Mr. Holmes, one of the analysts of Somerset House, was with them. There was no distilling going on then. Witness explained to Mr. Bush, jun., the nature of the offence and the law. He requested witness not to remove the spirit until Mr. Bush, sen., came, and he said he would not. When the defendant came and was told of the affair, he said it was the practice of the trade to separate gum from the "finish," and that he was ignorant of the law on the subject.

In cross-examination, the witness said he had not heard of such a practice as that of the defendant's being carried on before by the trade. There was no desire by the defendant to conceal anything.

Mr. John Harper, supervisor of Excise, corroborated; and Mr. John Holmes, analyst, spoke as to having examined the samples, and found them to be methylated spirits, and the solid matter in the stills he found to be gum resin.

Mr. Pollock said with regard to the separation having been carried on he would not dispute, but pointed out that everything had been done by the defendant in an open manner. The defendant likewise had acted in ignorance of the law.

Mr. Chance asked if the facts were admitted, and Mr. Pollock replied in the affirmative, but contended that within the meaning of the Act it was not a distillation of spirits going on, but it was methylated spirits. A long discussion arose over points raised by Mr. Pollock, especially upon the one as to what was meant by "spirits," the learned counsel pointing out that in many articles "spirits" were used.

Mr. Chance said he should well consider the points raised before giving his decision.

The other summonses against the defendant were then proceeded with—the first being for his having carried on the trade of a compounder of spirits, and for compounding spirits without a licence.

Mr. Highmore said the defendant would be bound to have taken out a licence as a compounder quite distinct from that of a distiller. The defendant was the maker of compounds for spirits and liqueurs, and he would show such essences contained "spirit." Under such a business it was likewise required there should be an "entry" of the premises, and a very strict survey. None of these had been complied with.

Mr. Parry, the supervisor, gave evidence in support of the learned counsel's statement, and the evidence of the analysts was given stating that in their opinion the "essences" were "spirits."

Mr. Pollock said that the defendant had carried on the business for many years, and he had in his possession the circulars of many others who for a long period had carried on a similar business. At the Exhibitions from 1851 downwards, medals had been awarded for these "essences" and no proceedings had been taken.

Mr. Highmore said such a trade might not have been known to the authorities, or perhaps the article had been manufactured by a "licensed" compounder. If it had been known the authorities would have interfered.

Mr. Chance said there were certainly many important points to be considered, and he should take time to give his decision upon them. He could hardly understand how these matters had gone on without being known to the authorities.

Mr. Pollock observed that even the Prime Minister must have known it.

The cases were then adjourned.

Alleged Poisoning by Belladonna.

Mr. Carttar, Coroner for West Kent, held an inquest on Monday, at Plumstead, on the body of Henry John Cetewayo Kitchingham, aged two years and seven months. On Thursday the child was playing in the garden of 3, Wellesley Terrace, Anglesea Road, Plumstead, where its parents lodged, and was seized with vomiting, and getting worse he was taken to Dr. Ingledew's surgery, where it was found he was suffering from inflammation of the stomach and intestines, due to some irritant poison.

Mrs. Reeves, landlady of the house, said she noticed some of the children who were playing with the deceased come in with some flowers and a weed like that produced, which she remarked at the time was very poisonous, and threw it on the fire. A wooden fence separated her back garden from that of No. 2, and the flowers and weed, she believed, had been plucked through the fence, as she had no such flowers or weed in her garden.

When the jury viewed the body they also inspected the next garden, and amongst some scarlet runners the Coroner drew their attention to some deadly nightshade or belladonna, the berries of which were green.

Dr. Ingledew said the weed produced was nightshade, and from a *post-mortem* examination he attributed death to the deceased having eaten some of the berries.

Mrs. Henderson, the neighbour, produced some of the weed and said she had since cleared her garden of it.

The jury returned a verdict of death from accidentally eating berries of deadly nightshade.—*Standard.*

Reviews.

The Manual of Colours and Dye Wares. Second Edition. By J. W. Slater. London: Crosby, Lockwood and Co.

In this little manual of two hundred and thirty-four pages, the dyer, calico printer and drysalter will find a fair amount of really valuable information, given in a brief and thoroughly practical form, under an alphabetical arrangement favourable for easy reference.

The particulars given embrace the results of recent researches on colouring matters, the modes of testing dye wares, the strength of acids, etc., together with some useful tables of French weights and measures reduced to their English equivalents, and hydrometer tables of Baumé and Twaddell, compared with the actual gravities to which they correspond. Soaps and mordants are well described, and the chemical properties of dye wares correctly stated. The latter descriptions might in some cases have been elaborated with advantage, but what is stated appears to be singularly correct. The only errors are a few misprints, such as the proper names of inventors or manufacturers:—"Perkins," "Lewinstein," "Fel" and "Bayer," standing for Perkin, Levinstein, Fol and Baeyer; and "Bismark brown" is not a true rendering of the colour named after the great German Chancellor. "Mythylic alcohol" is another mistake, and on page 162, for "permanganate" read "ferrocyanide." Excepting these clerical errors, and another (on page 131), where it is said that "Tin (or iron) dissolved in nitric acid is more readily deposited upon cotton than if hydrochloric acid were the solvent," the book throughout seems thoroughly trustworthy, and we feel pleasure in recommending it to the notice of dyers and others interested in the technical branches treated of in this useful little manual.

Remarks on Certain Medical Principles and Publications. By Dr. Joseph Hamernik, Prague. Translated from the German by F. Marks. London: E. W. Allen. 1882.

This pamphlet belongs to a class of literature that is sufficiently represented by indigenous productions to have enabled the English community to have dispensed with

imports of it from foreign lands. Its principal characteristic is a maximum of assertion and a minimum of proof. When doctors disagree ordinary mortals do not usually volunteer to decide, still, if they are appealed to they might require something more than three dozen pages of dogmatism before giving a verdict against all that is "orthodox" in medicine. The author is evidently not troubled with doubt. Vaccination is denounced by him as worse than useless, without the reader being favoured with the evidence leading to that conclusion. He is told cow pox has no connection whatever with small pox, and that "in the event of an attack of small pox it is of no manner of importance whether the patient is vaccinated or not." Though he may find this difficult to reconcile with a statement on the opposite page that "persons are most liable to be attacked by small pox in the years immediately succeding vaccination." Vaccinators with original cow-pox lymph are described as "for the most part charlatans, who produce the pustulation in the udder of the calf or cow by solutions or ointment of tartar emetic, and drive a fraudulent trade in it." All aperients are said to be superfluous and mischievous, and Hunyadi-Janos water is specially singled out for condemnation, apparently because of its dissimilarity to ordinary drinking water. "Disinfection does nothing in the way of preventing disease or rendering it milder." And so on, *usque ad nauseam.*

Notes and Queries.

[737]. Extractum Cinchonæ Liquidum.—On several occasions whendispensing the above preparation, contentions have arisen, sometimes with the patient, sometimes with the prescriber, as to the proper appearance of mixtures in which it has been ordered. The patient is continually complaining that the medicine is not like the last, made up elsewhere; and the doctor himself sometimes will hardly be satisfied with the explanation one has to offer, even though one goes deeply into the subject and harangues him for half an hour on the great difference observable in it as obtained from different establishments, and as prepared from different species of cinchona.

One exhausts one's knowledge of materia medica and wastes one's breath to very little purpose: the mixture has been made before at a first rate West End house; mine is not like it, as it ought to be, and there's an end of the argument.

This strikes me as being so very unsatisfactory, that I am now led to seek the consolatory comments of some kind brother pharmacist.

Three samples of ext. cinch. liq., obtained from well known sources, gave the following divergent results. The experiments being carried out in 1-ounce phials, and 20 minims of the extract added to each, then allowed to stand twelve hours.

No. I.

With distilled water only.

Colour of mixture golden-brown. The precipitate occupied about one seventh of the phial, of a dirty yellowish brown. It shook up easily. Supernatant liquid clear, amber-colour.

With 5 grs. amm. carb.

Colour of mixture dirty yellow-brown. The precipitate occupied about one fifth of the phial. A pale mud-colour; fine, and easily shaken up; supernatant liquid opaque, light brown.

No. II.

With distilled water only.

Colour of mixture purplish liver-colour. The precipitate occupied a fourth of the phial. Dingy purple; softly flocculent; shook up well, but soon began to come down again. Supernatant liquid clear and rather darker than No. 1.

With 5 grs. amm. carb.

Colour of mixture pale brick-red. The precipitate occupied a third of the phial. Sand-red colour. In large flakes and slightly granular. Not mixing thoroughly when shaken, and beginning to fall at once. Supernatant liquid clear, bright orange.

No. III.

With distilled water only.

Colour of mixture bright brown. The precipitate scarcely more than covered the bottom of phial. Dense, and not shaking up so easily; dark brown. Supernatant liquid opaque, dark brown.

With 5 grs. amm. carb.

Colour of mixture nearly black by reflected light. The precipitate very dark brown; small; dense, with some inclination to stick to the glass. Supernatant liquid opaque, dark brown.

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[738]. "Lin. Scorpii."—Can any reader of the Journal favour me with the formula of the above, as I am unable to find any mention of it in any book of formulæ? F. Herington.

Obituary.

T. B. STEAD.

It is with regret that we have to record the death of Mr. T. B. Stead, chemist and druggist, of 20, Upperhead Row, Leeds, which took place on the 14th inst. at his residence, Roundhay. Mr. Stead had been ailing for some time, but his illness did not assume a serious form until last week. On Tuesday last he consulted Dr. Horsfall as to his condition, and that gentleman advised him to take a few days' rest. Mr. Stead gradually became worse, congestion of the brain set in, and he died on Monday. Mr. Stead held the position of President of the Leeds Chemists' Association at the time of his death, having been one of its founders just twenty years ago. His sound sense, genial manner and willingness to work for public objects had secured for him the esteem of his brethren in the ranks of pharmacy. He represented the Leeds district on the Executive Committee of the Chemists and Druggists' Trade Association, and was a regular attender of its meetings in Birmingham. The deceased gentleman represented the West Ward in the Town Council from 1872 until November last, when he did not seek re-election. During his connection with the Corporation he rendered much useful service as a member of several important committees. He was the means of bringing to light many of the anomalies which existed in the collection of the rates in the townships, and on the formation of the committee for levying the rates over the borough he was appointed its chairman, an office which he held until his retirement from the Council. For many years he was a member of the board of overseers of the township of Leeds. As a thorough-going politician he actively engaged in many parliamentary and municipal contests, always displaying a generous spirit, which gained for him the admiration of his opponents, as well as the esteem of those who worked with him. He leaves a widow, a son, and daughter.

Notice has also been received of the death of the following:—

On the 21st of July, Mr. Robert Lambert, Chemist and Druggist, Haworth. Aged 78 years.

On the 22nd of July, Mr. Sydney Herbert Witherington, Chemist and Druggist, Wandsworth Road, S.W. Aged 44 years.

On the 28th of January, Mr. Thomas Howie Hopper, Chemist and Druggist, High Street, Hawick. Aged 64 years.

On the 29th of July, Mr. Alexander Holroyd, Chemist and Druggist, Widnes. Aged 39 years.

On the 29th of July, Mr. Thomas Andrews, Chemist and Druggist, Shrewsbury. Aged 50 years.

On the 31st of July, Mr. William Symes Pryer, Pharmaceutical Chemist, Axminster. Aged 75 years. Mr. Pryer had been a Member of the Pharmaceutical Society since 1853.

On the 6th of August, Mr. Richard Bird Mitchell, Chemist and Druggist, Chulmleigh. Aged 49 years.

On the 11th of August, Mr. William Ruston, Chemist and Druggist, Grey Street, Newcastle-on-Tyne. Aged 39 years.

Correspondence.

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

The Future of Pharmacy.

Sir,—If your correspondent "Wulfruna" will make a simple calculation he will find that the prices he quotes in your last issue are not, after all, anything "special," but the usual wholesale price, with a fair profit for bottling, etc., and if there were a demand among retail chemists for packed drugs of that description I have no doubt they would be supplied on quite as reasonable terms. There is a firm of grocers in the immediate vicinity of my shop who retail many of the articles at the same and in some cases less than the price "Wulfruna" quotes.

Why we should "Boycott" those firms who supply stores I cannot understand, for if a wholesale chemist publishes a list of prices at which he is prepared to supply drugs to all *bonâ fide* wholesale buyers it should not concern him who those buyers are, so long as they have the money to pay for their goods. I doubt if your correspondent could point to any wholesale firm in London which would refuse a good ready money order from any of the London stores.

It is not by any such pettish actions as those advocated by "Wulfruna" that the questions of co-operation are to settled or pharmacy advanced to that professional dignity "Wulfruna" would see it occupy. It is within the power of Parliament only to give us the necessary legislation that will raise pharmacy above the level of other competitive trades, and until that legislation is granted we must be content either to hand over a large portion of our business to the grocers and the stores, or to try and compete with them. For myself, I prefer the latter course.

H. S.

Sir,—I beg to make a few remarks in the Journal on the above subject. It is a burning question amongst us, and any practicable suggestion likely to be beneficial would undoubtedly be welcomed by the whole profession.

We have just had before us Professor Attfield's excellent scheme, which was pretty generally approved. Being myself an outsider,—a country druggist,—I could not take the liberty of intruding on your space with my opinion. I was, however, glad to see that a very great majority endorsed that scheme. But in the meantime the "stores" are our *bête noire*, and we have suggestions without end as to our attitude towards them. It is the letter of your correspondent "Wulfruna" on the stores and their treatment, in last week's issue, under the heading "The Future of Pharmacy," which induces me to write you.

His ideas appear to me to be impracticable and inconsistent. He advocates "Boycotting" firms supplying stores, though he is of opinion that "we cannot blame stores." We cannot. So long as they avoid infringing the law they are perfectly legitimate concerns. It cannot be maintained that there is any difference in, *e.g.*, the glycerine, B.P., which the chemist sells at, say 3*d.* per oz. (the Liverpool chemists' price list), and the glycerine, B.P., 4-oz. bottle at 6*d.*, Lewis's price. The truth is the profits of the chemist and druggist have been too high. The prices "Wulfruna" quotes from the list of a wholesale house supplying stores,—the lowness of these prices is apparently the principal occasion of his letter,—are quite as high as he himself would buy at from any wholesale house. In most instances they are, I think, higher. But whatever these prices might be, they would be probably the same to everybody for the same quantity and terms. It is a matter of competition. The stores employing a larger capital require less percentage of profit. I have a general dealer next door to me selling at store prices. Amongst other drysalteries he sells 3-oz. bottles castor oil, at 3*d.* each; 4-oz. bottles at 4*d.*; cream of tartar, 1*s.* 4*d.* per lb.; tartaric acid, 2*s.* per lb.; seidlitz powders, 10*d.* per box; extract of meat (Company's), 1*s.* 3*d.* for 2-oz. pot; toilet soaps, about 33 per cent. off usual retail prices. I must then either sell at these prices or not sell these articles at all, for even at these prices he makes as much per cent. on his turnover as he finds necessary to the profitable carrying on of his business. How could we "Boycott" firms supplying him? We could not "Boycott" castor oil nor extract of meat. We cannot blame the stores so long as they deal honestly, nor the public for laying out their money economically. The chemist and druggist himself is, I think, to blame. He has, in the business of distributing "patent medicines and perfumery," "homœopathic medicines," "toilet requisites," etc., put a fictitious value on his services. But he can now bring his professional education to bear. "Knowledge is power." This is true, whether the knowledge be business or scientific. If "Wulfruna" (I speak generally) be placed in a situation where nothing more is required than a distributing capacity, he must either accommodate himself to his environment, or shut up. If his scientific ability merit it he will find scope and obtain customers in spite of "cutting" stores. It is not by "Boycotting" wholesale houses that we may improve our position. That could only be done by a demand for more skilled labour on the part of the medical faculty and the public, and the supply of that labour.

The law relating to the practice of pharmacy may require amendment, but reform is much required within the ranks of chemists and druggists. Instead of the charlatanry, chicanery and huckstering, which so widely prevail, let us cultivate a purer pharmacy.

It will eventually come, throughout the country, to what it has already come to in many places. Those most fitted for pharmacists have survived, and their businesses have become more truly pharmaceutical than ever. Those most fitted by education and position to become traders have, by speculation, untiring energy and economy, developed stores into a financial success. The weak have gone to the wall.

W. B.

Leeches.

Sir,—In the matter of leech keeping I am sorry to have to say that my experience differs very greatly from that of Mr. Lamble, my conviction being that in order to ensure the keeping of leeches in perfect health you will have to change their water very often indeed. So far as mine are concerned I have found that they have flourished the most vigorously when the water was changed every day, and that they soon began to stagnate when neglected for a few days, not to speak of weeks or months. I should like to hear from Mr. Lamble how he gets over the difficulty of vegetation on the surface of the water and sides of the aquarium.

Aquam.

W. Miller.—Nos. 1, 3 and 5 are named correctly. 2. *Hypericum perforatum.* 4. *Anthemis Cotula.* 6. *Teucrium Scorodoma.*

J. J.—We know of no reason why the two substances mentioned should form a dirty brown mass.

R. F.—Numerous forms for coating pills have been already published, and may be found by reference to the Index.

Vin. Aurant.—We think that there can be no doubt that the wine has undergone acetification.

A. B. C. is thanked for his communication.

Communications, Letters, etc., have been received from Messrs. Morley, Macdermot, Benest, Garrett, Dobson, Thompson, Aquam.

John C. Thompson,

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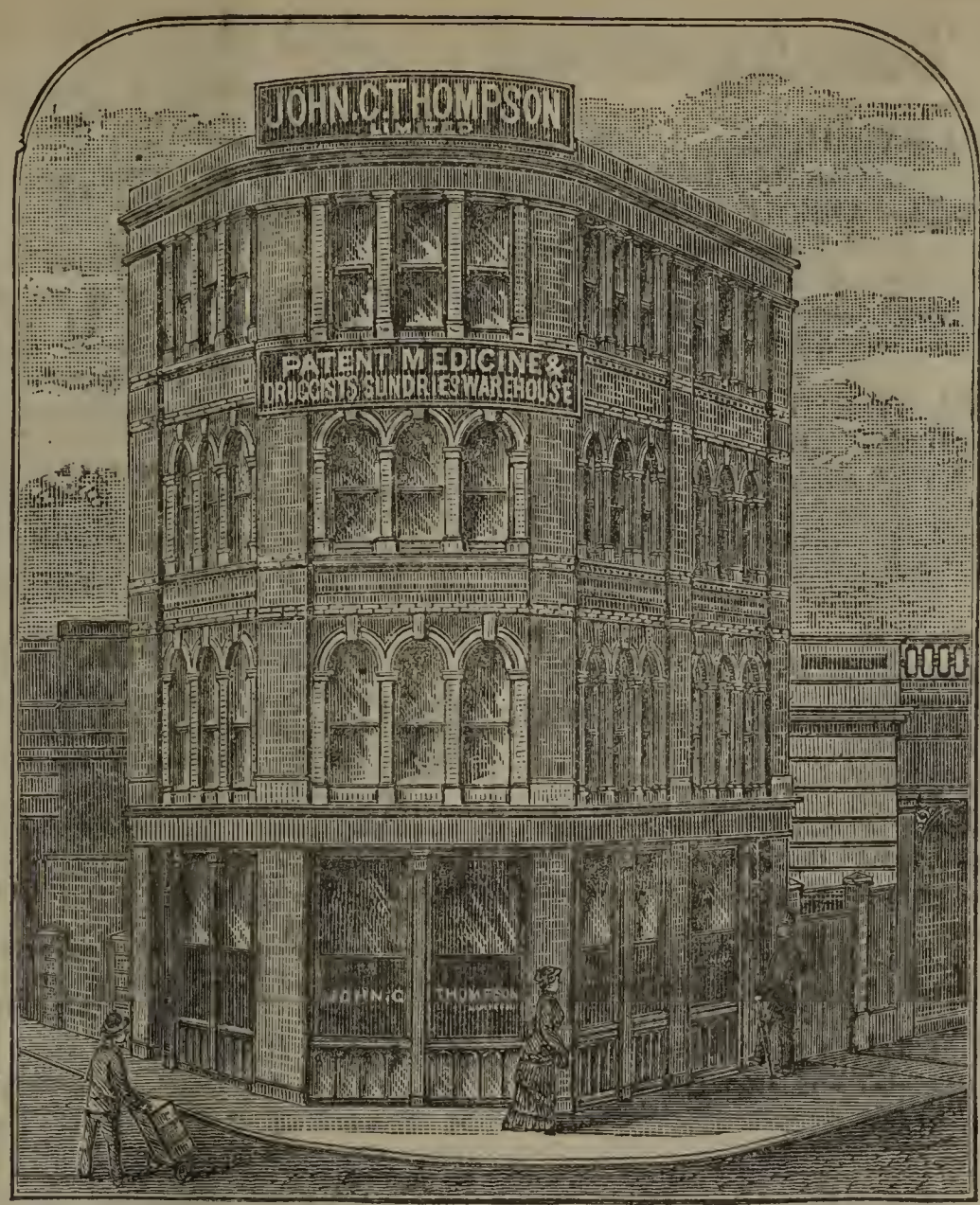

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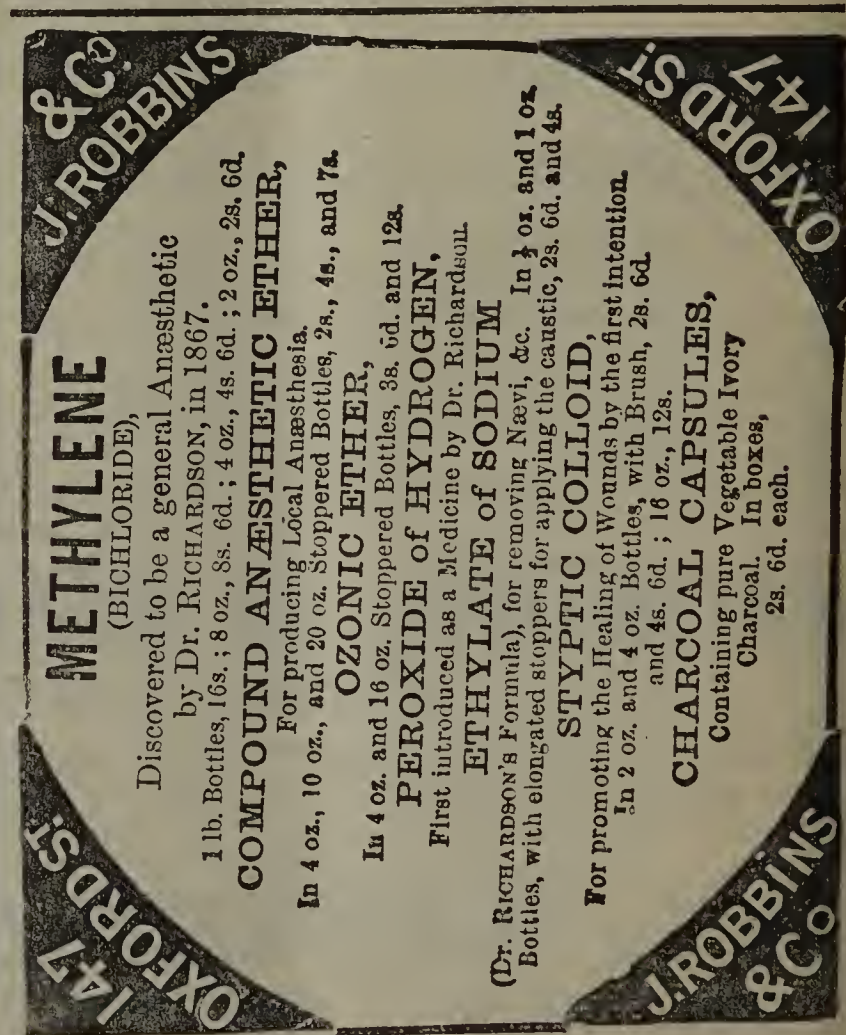

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St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

The London Hospital and Medical

College, Mile End, E.—The SESSION 1882-83 will commence on Monday, October 2, 1882. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other Hospital appointments are free. The resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis. MUNRO SCOTT, Warden.

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During the ensuing Session there will be awarded five Medical Scholarships, viz.:—one of £80, one of £30, and three of £20, for professional efficiency; one for Chemistry of £40; one of £50 for resident students only; and two Sambrooke Registrarships of £50 each.

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For Prospectuses and other information apply personally, or by post-card, to J. W. Cunningham, Esq., King's College, London; or to Professor Bentley, Dean of the Department.

PRELIMINARY.—Mr. T. S. TURNER, Head Master Grammar School, Hingham, Norfolk, having been very successful in passing Candidates for this examination, is desirous of forming a Class of youths under 16, to read for the January examination. Fees from Sept. 11th to Dec. 22nd, £12, including board, lodging and loan of books. Full particulars and pass list on application.

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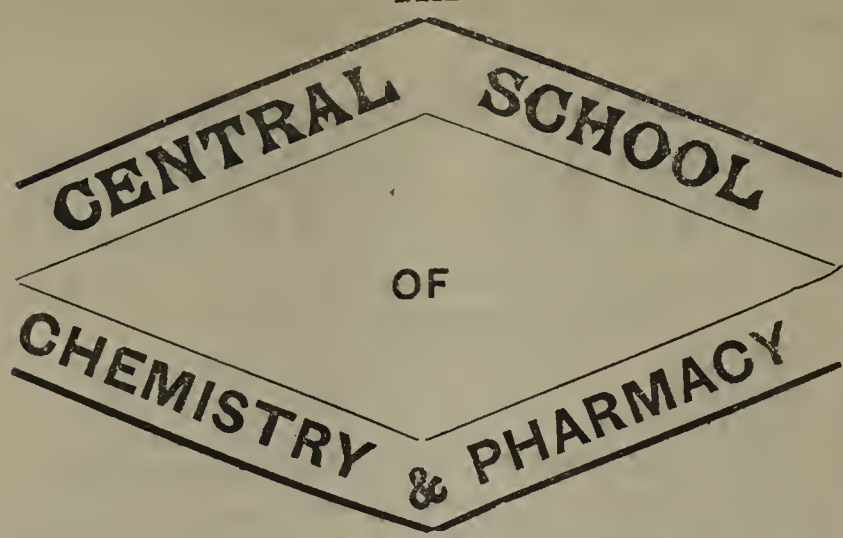

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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

At the Examinations held in June, the following **10** Students passed from this College:—

MINOR.

Mr. C. A. ARKLE
" W. T. COOMBS
" T. F. ELTON
" A. HILL
" U. A. COATES
Mr. J. HUMPHRIES
" J. RICKETTS
" G. SPENCER
" C. L. THOMPSON
" W. TWISS

At the Examinations held in July, the following **41** Students passed from this College:—

MAJOR.

Mr. F. HOLMES
Mr. G. MURRAY
Mr. J. WHEATLEY.

MINOR.

Mr. J. H. BELL
" A. W. BERRY
" J. BOWERING
" H. W. CAVE
" E. E. COMER
" H. E. CULLWICK
" G. DANIEL
" H. ELEY
" J. R. EVANS
" J. B. FOGGITT
" J. H. FROST
" J. H. GASKIN
" G. R. HANKINSON
" T. C. HEWLETT
" R. W. HICKSON
" H. S. HOGG
" D. INNES
" J. G. LOAM
" W. LONGTOFT
Mr. J. MANN
" A. NICHOL
" H. E. NOBLE
" A. E. NORBURN
" C. NORTHEN
" T. H. PARKER
" A. PELLEW
" W. PICKERING
" R. PINDER
" J. G. RODMELL
" T. W. ROWLAND
" W. T. SERGENT
" W. H. P. SHAPCOTT
" J. H. THOMAS
" E. WARBURTON
" W. WEDDLE
" J. S. WELLBURN
" W. G. WELLS
" H. G. WORTS

The Eleventh Session will commence on Friday, Sept. 1.

N.B.—There is only one vacancy in the Major laboratory until after the October Examination.

For Revised Prospectus and further particulars apply to

Messrs. WILLS & WOOTTON

TRINITY SQUARE, LONDON, S.E.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS, A.P.S., G.S.T., &c.

130, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE EARLY IN SEPTEMBER

EIGHT of my Students presented themselves at the JULY Minor, **SIX** passed. Three others received their finishing instruction from me, but being at other schools at the time of passing are not included in the above total. **TWO** out of **FOUR** of my pupils passed at the JUNE meeting.

A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER candidates. Enclose stamp for particulars.

Laboratory close to Gower Street Station.

TERMS FOR ADVERTISEMENTS

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J. & A. Churchill, 11, New Burlington St., London, W.

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LABORATORY, Wholesale Druggist's, either in England or abroad. Experience in Pharmaceuticals, Specialities, also Tinctures and Steam Goods. Good references. F. Pitcher, 74, Kellett Rd., Brixton, S.W.

TO Apprentice a gentlemanly and well educated youth (who has passed the Preliminary examination) in a good country house, where the principal would undertake to thoroughly teach him the business and help him to pass the Minor and Major examinations. Must be a comfortable home. Moderate premium would be given. Youth is 17. Height 5ft. 9in. Good appearance. Address, Guardian, care of Messrs. Fitze & Co., 70 & 71, Bishopsgate St. Within, London.

AS Temporary Manager. Town or country. J. H., Holly House, Upper Clapton, E. Pimlico till 21st.

ENGAGEMENTS WANTED.

TO place a youth (who has been in the business 3 years) as an Improver in a good house of business in London, where time would be allowed for study and to attend lectures. Salary no object. Aged 17 years. Address, Chemist, care of Messrs. Davy, Yates & Routledge, 64, Park St., Borough, S.E.

LOCUM Tenens. About October 9, for 2 or 3 weeks, by an experienced Registered Chemist. Terms moderate. Locum Tenens, 111, Earl's Court Rd., London, S.W.

IMMEDIATELY.—With Surgeon, in Retail. Town or country. Good Prescriber and Dispenser. Also can Extract Teeth. Unexceptional reference. Moderate salary. Carbolic, 20, Richard St., Upper St., Islington, N.

THE Advertiser (38), A.P.S., disengaged from 10 till 5 daily, offers his services to medical men or chemists. A.P.S., 820, Old Kent Rd., S.E.

AS Junior. Unqualified. Salary no object. Othus, Mr. Todd, 175, Manchester Rd., Hollinwood, near Manchester.

DRUG Trade.—By gentleman, thoroughly experienced, both in town and country, an engagement as Locum Tenens, Traveller, Manager, or any place of Trust. Hole, Westbury, Wilts.

AN Assistant. Out-door, and where 2 or more are kept preferred. Age 23. Height 5ft. 8in. 6 years' experience. Good references. Alpha, 29, New Mill St., Dudley.

IMMEDIATELY.—As Junior. 8½ years' experience. Country preferred. Alpha, Mr. Hooper, 39, Wych St., Strand, London, W.C.

WHOLESALE and Export Drug Trade.—Through dissolution of partnership, the advertiser requires a Position of Trust. Thorough knowledge of Counting House, and the Export Trade. Alpha, 14, Camplin St., New Cross, S.E.

AS Junior in a good country business. Age 21. Height 5ft. 10in. Town and country experience. Highest references. Disengaged early in September. Chemicus, Mr. Mantz, Stationer, Bury St. Edmunds.

AS Assistant. Age 21. Minor qualification. Accustomed to Dispensing, Prescribing and general Retail. Please state usual particulars to M., 92, St. John's Rd., Hoxton, London.

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TO Apprentice a well educated youth. Age 15. Passed Preliminary. Small premium will be given. Cambridgeshire or adjoining counties preferred. Apply by letter only to Mr. Whibley, 32, Market Pl., Cambridge.

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ENGAGEMENTS WANTED.

TRAVELLER to Wholesale Druggist. Good experience and reference. Acquainted with London, South Coast, Midlands and North of England. London preferred. S., 6, Gordon St., Colbroke Row, Islington.

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JUNIOR. In good house. London or suburbs. 5 years' experience, town and country. Age 20. Passed Prelim. W. W. WILLIAMS, 17, Market St., Haverfordwest.

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AS ASSISTANT. Minor qualification. Age 24. Height 6ft. London (West-end) and provincial experience. Good references. Apply, stating salary, to ASSISTANT, 20, Boundary Rd., St. John's Wood.

ASSISTANTS WANTED.

DRUG and Grocery.—A young man, about 22, for Drug counter, and to assist at grocery and travel when required. Full particulars to JOHN C. COLES, Chippenham, Wilts.

DISPENSER, out-door, in West-end private practice. Must be very neat and accurate, of good appearance and address, and not over 24. Apply by letter only to Mr. NEWTON, St. George's Hospital, S.W.

F. M. RIMMINGTON & SON, Bradford, Yorks, have a vacancy for an out-door ASSISTANT, about 22. He must have been accustomed to a genteel business, and competent to Dispense and keep accounts. A good general knowledge is requisite, also good references.

IMMEDIATELY.—A respectable youth, age about 17, as IMPROVER or TURNOVER, for a light Retail business. Must be active, willing, and obliging. State full particulars to J. HOLLOWAY, Post Office, Finsbury Rd., Wood Green, N.

AUGUST 26th.—An in-door ASSISTANT, thoroughly competent to take entire charge of small Retail business. Age about 24. T. H. HURLE HOBBS, Pharmacist, Kirkdale, Sydenham.

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ASSISTANT, in-door, about 22 years of age, capable of taking charge during absence of principal. Also an APPRENTICE. F. B. SELLORS, Chemist, Tewkesbury.

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DISPENSER.—For the Public Dispensary, 59, Stanhope St., Clare Market, an efficient DISPENSER. He must be between 20 and 40 years of age, and a Member or Associate of the Pharmaceutical Society of Great Britain, or possess the qualification (of Dispenser) of the Apothecaries' Company. Hours from 12 to 2.30, and from 4 to 6 daily (Sundays excepted). Salary 21s. per week. Applications, accompanied with testimonials, to be made in writing, and sent to the Secretary, at his offices, 5, Bishop's Court, Chancery Lane, not later than Saturday, the 26th August, and candidates must be in attendance at the Dispensary House, 59, Stanhope St., Clare Market, at 3 o'clock, on Wednesday, the 30th August, when the election takes place.

16th August, 1882. JOHN PHILLIPS, Secretary.

A JUNIOR ASSISTANT. Out-door. For a country business. Must be a good counterman. No Sunday duty. Hours 8 to 8, and 1 evening a week off. Apply, stating salary required, when disengaged, and usual particulars, to GRADIDGE, Chemist, Andover.

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IMMEDIATELY.—In-door. An ASSISTANT, of gentlemanly appearance and address. Not less than 22 years of age. Must be a good Counterman and able to introduce and push business. State age, height, reference, and salary required, to GEO. S. HIGHMOOR, 46, Waterworks St., Hull. A vacancy also occurs for an APPRENTICE or IMPROVER.

VERY shortly, an active and trustworthy ASSISTANT. May be required to take charge of Branch business, or (otherwise) to assist at principal establishment. Must have had good experience, and produce satisfactory testimony as to ability and character. Apply, Mr. ROBERTS, The City Chymist, Newcastle-on-Tyne.

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AN in-door ASSISTANT, over 22 years of age, with good references. Write or apply to L. E. BEERE, 23, Hampstead Rd., N. W.

AN IMPROVER, about 18, for an old-established light business in London, close to large park. Apply, or address E. G. MORRIS, 223, Deptford Lower Rd., London, S.E.

AT once.—As Second ASSISTANT. Age about 22. Minor or Hall qualification. Experienced Dispenser. Good writer. Hours of business 8 to 8.30. Allowed 1 evening a week and whole of every other Sunday. Salary £45. Useless writing. Must apply personally, mornings 10 to 12, evenings 6 to 8. D. WHITE & SON, 19, Park Ter., Regent's Park.

IMMEDIATELY.—As in-door ASSISTANT, for a light London Retail. Must be a Minor; if working for Major can have time for study. Enclose photo. and particulars to B. A., Messrs. Newbery & Son, 1, King Edward St., E.C.

QUALIFIED ASSISTANT, for City. Out-door. Hours from 8.45 a.m. till 7 p.m. Business closed on Sundays and bank holidays. Apply, BEDFORD & Co., 3, Queen St., Cheapside, E.C.

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ASSISTANTS WANTED.

A JUNIOR ASSISTANT for two or three weeks, in an agricultural district. THOMAS ROMANS, Wrotham, Kent.

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DR. SARGENT, Dorrell Pl., Brixton Railway Station, London, requires an ASSISTANT forthwith, able to Dispense, Extract Teeth, and attend a Chemist's Retail. Salary 11/6 per week, with board, lodging, and washing. Hours of business, 8 a.m. till 9 p.m.; Sundays, 6 p.m. till 9 p.m. Time for study.

ASSISTANT. Out-door. One used to Mixed country trade preferred. Apply, with particulars and references, to BLUNT & EVANS, Chemists, Market Pl., Derby.

MR. SHIRLEY, of 2, Westbourne Grove, Bayswater, requires a Junior ASSISTANT, accustomed to a good Retail and Dispensing business. Personal interview preferred. State height and salary required.

A COMPETENT and qualified ASSISTANT for the Dispensing department. One accustomed to first-class trade. Address, with full particulars as to age, salary &c., SANDERS & KEEN, 28, Park St., Bristol.

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IN a flourishing town in Surrey, on the Thames.—First-class Retail and DISPENSING. Stock, fixtures and goodwill. £750. Apply to J., care of Evans, Lescher & Webb, 60, Bartholomew Close, London, E.C.

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IN the Metropolitan district.—A respectable BUSINESS, the net yearly profit from which amounts to from £300 to £400. The premises are large and commodious and on a lease at a low rental. The circumstances connected with the business are such as will be entirely favourable to such as desire to do a large trade, and full particulars will be furnished after exchange of references. Apply, A. B., Dresden House, Shaftesbury Rd., Hammersmith, W.

FOR £50.—To Chemists, &c. An increasing Retail and open SURGERY. Situated in a main thoroughfare in town, near station. Low rent. Address, B. B., 27, Halsey St., S.W.

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MESSRS. GURDEN BERDOE have for transfer:—LONDON, N.E. Corner Retail Prescribing Trade. Returning £400 drugs, £200 dentistry. Nice house and stable. £550, or less if arrangements made to work dentistry to mutual advantage. N. Genuine Retail. Returning £400. For £175. S.E. Unopposed Retail. Returning £7 weekly. For £150. Another, showing £600 net profit. For £1000. Also, 5 MILES OUT. Retail and Prescribing. Yielding £300 net profit. For £400 cash. With splendid opening for Dentistry. CAMBRIDGESHIRE. Totally unopposed Retail and Prescribing Trade. Returning £400. Rent £10. Good house. Excellent garden. Only £125, to sell immediately. Apply, 30, Jewry St., Aldgate, City.

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IMMEDIATELY.—The valuable Stock-in-Trade, Fixtures, Goodwill, &c., of the late Thomas Brooke Senior. The business having been successfully carried on by Mr. Senior for 24 years renders the opening a very desirable one for an active and energetic man. Price £200. Apply, No. 14, Kirkgate, Wakefield.

GOOD Dispensing BUSINESS. Well fitted corner shop. Best position in the town. Established 50 years. Returns average £800. Full prices for patents, drugs, &c. To an immediate purchaser easy terms or reasonable offer entertained. Address, in confidence, CHEMIST, care of Mr. J. Thompson, 58, Hanover St., Liverpool.

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AT once.—S.E. Handsomely fitted, well stocked, corner SHOP (Chemist's). In densely populated and growing neighbourhood. Good house. Full prices. Half value will be taken. Letters, W. J. B., Messrs. Wright, Layman & Umney, Southwark St., S.E.

IMMEDIATELY.—Owing to bad health. Ready-money Prescribing, Dispensing and light RETAIL. In Midlands. Takings from £8 to £10 per week, without assistance. Convenient premises. Low rental. Delightful neighbourhood. Thriving town. Excellent opportunity for energetic man. Price for everything, including furniture, £200. L. M., Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

SCOTLAND.—The Retail and Dispensing BUSINESS of a medical gentleman for transfer. In best position of Glasgow. Vendor will send prescriptions and guarantee net income for first year of £200. Price £350; part of which can remain. Mr. BRETT, Valuer, Leicester.

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PARTNERSHIP, with view to succession. In an improving West-end suburb. Present returns between £500 and £600. No agents. Address, PHARMACIST, care of Hodgkinson, Prestons & King, 88, Leadenhall St., E.C.

IN Nottingham.—Taking £20 per week ready-money, and booking extra. A rare opportunity. Write for full particulars. Price £450. Illness cause of disposal. Mr. R. TOMLINSON, Shop Fitter and Valuer, 15, St. Paul's Sq., Birmingham.

WANTED TO PURCHASE.

A LIGHT Retail and Dispensing BUSINESS. Returning about £1000. No agents. Full particulars to Mr. TAYLOR, Chemist, Westbury, Wilts.

FOR SALE.

SHOP Rounds, 8s. doz.; 12 Olive Green Ointment Jars, 24s.; Brown Ointment Pots, japanned covers, 8s. doz.; 3 Pear Shape Carboys, cut stoppers, 31in. high, with stands, 25s. each; 36 Black Stock Bottles, gilt caps, 1s. 6d. each; 12 Clear Glass Jars, elaborately labelled, gold covers, 15in. high, 8s. 6d. each, Fig. D; Perfume Bottles, Blue Jars, Fig. D, 12in. high, 8s.; Specie Jars, 80s. per pair, equal to new. E. NATALI, 207, Old Street, Shoreditch.

FOR SALE.

A 12ft. Spanish Mahogany Counter, fitted under with drawers, £10; a 12ft. Plate-glass Case; fronted Counter, mahogany top, fitted under with drawers; a very elaborate fitting, about 22ft. long, Spanish mahogany and plate-glass, 10ft. high, a bargain; the entire fittings of a first-class chemist's, removed from near Sloane Street, to be sold, a bargain; also several Dispensing Screens, Glass Counter Cases, Desk and Cases, several flat top plate-glass Counter Cases, to open on top, very cheap. E. NATALI, 207, Old Street, Shoreditch.

A GENTLEMAN, calling upon Chemists in London and having City offices, is desirous of acting as AGENT or TRAVELLER for a Provincial or Foreign house in articles connected with the Drug trade, or would introduce good specialities or novelties throughout London. Address, CHEM, care of Messrs. R. Davis & Co., 58, Fenchurch St., London, E.C.

WYE HOUSE ASYLUM, Buxton, Derbyshire, for the Middle and Upper Classes of BOTH SEXES, is beautifully situated in the healthy and bracing climate of the Derbyshire Hills, and is directly accessible by the Midland and London and North Western Railways. For terms and other particulars, address the Resident Physician and Proprietor, Dr. F. K. DICKSON.

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Pharmaceutical Journal

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SPECIAL NOTE.

The Library and Museum will not be open in the Evening during August.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

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3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

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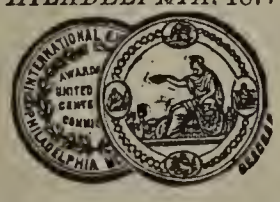
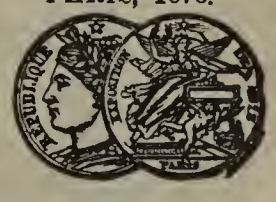

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15th March, 1882.

The Pharmaceutical Journal.

SATURDAY, AUGUST 26, 1882.

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRITISH PHARMACEUTICAL CONFERENCE.

SOUTHAMPTON has during the past week been the rendezvous of such pharmacists as have been able and had the inclination to avail themselves of the opportunity afforded by the annual meeting of the British Pharmaceutical Conference to vary the monotony of the ordinary routine of their lives by friendly intercourse with their *confrères.* The Conference commenced on Tuesday, at half-past ten o'clock, in the WATTS Memorial Hall, under the presidency of Professor ATTFIELD, F.R.S., the visitors being welcomed, in a few well-chosen words, by Mr. RANDALL, speaking in the name of the local pharmacists. The audience was not so large as on some similar occasions in previous years, and did not nearly fill the area of the handsome hall in which the Conference met; whilst the general attendance appeared to be below the average, and this is confirmed by the number of signatures in the book placed at the entrance.

After a formal reception of the delegates present from various societies, the business of the meeting was commenced by the reading of the Report of the Executive Committee. The Report referred to the alterations that were introduced into the last 'Year-Book' and to the subject of grants in aid of original scientific research. It also mentioned the resignation of one of the General Secretaries, Mr. M. CARTEIGHE, in consequence of his accession to the Presidency of the Pharmaceutical Society of Great Britain, and stated that the consequent vacancy had been temporarily filled, at the request of the Committee, by Mr. SIDNEY PLOWMAN. From the Financial Statement it appeared that during the past year the expenditure had exceeded the income by about £65, which was partly due to a falling off in the number of members from whom subscriptions had been received. In alluding to this deficiency the President remarked that the introduction of the Parcels Post System would lessen the expense of distributing the 'Year-Book' in future, and he expressed an opinion that an appeal to the registered chemists and druggists who are not already members of the Conference should be followed by an increase of members sufficient to prevent a deficit in future years; further, that although the Committee had felt compelled to defer for the present, for financial reasons, the compilation of the General Index which had been suggested, the postponement would only be of short duration.

The Address of the President was undoubtedly the most important feature of the meeting. The Conference has been privileged in previous years to hear admirable addresses from different presidents, but in no previous year has a more marked impression been produced. As the Address is printed *in extenso* in another part of this Journal, it is not necessary to summarize it here, neither will this be the best opportunity for its criticism. As remarked by one of the speakers, it will doubtless be read with pleasure by all English speaking pharmacists, and the decided opinions expressed, couched in language that admits of little misunderstanding, will probably evoke a considerable amount of discussion. Indeed, that it has already attracted attention outside the pharmaceutical circle is evidenced by the fact that the *Times* has already devoted a leading article to the discussion of some of its topics. It will be sufficient to say here that the Address was admirably delivered and was listened to with that silent attention which is sometimes better evidence of interest than the most boisterous applause.

The first papers read consisted, as usual, of reports of work undertaken at the request, and with the aid, of the Conference. The first was a "Report on the Differences between the Essential Oils of Cinnamon and Cassia," by Mr. A. H. JACKSON. The reporter stated that, tested from a physical standpoint, the oils possess distinctive and characteristic odours and that the cinnamon oil has a more fiery taste than the cassia, but that neither the relative densities nor the refractive energies are sufficient guides in distinguishing mixtures of these oils, though the density of the oil of cassia was found to be somewhat greater than that of the oil of cinnamon. The chemical examination seemed to show that the constituent or constituents in which the oils differ from each other are present only in extremely small proportion. The next report was by Mr. A. W. GERRARD, "On the Alkaloidal Value of Belladona Plants," which was a continuation of a report on the same subject presented last year. The experiments referred to in the present report were made upon uncultivated plants in their first year's growth, from a chalk soil in Yorkshire and from a leaf mould in Sussex, and also upon cultivated plants in their second year's growth, gathered in May, June and July, or before flowering, whilst in flower, and whilst in fruit. The results obtained with the wild plants indicated that belladonna in the first year of its growth contains a very small proportion of alkaloid, but to that extent they were confirmatory of previous deductions by the author that the formation of alkaloid in the plant is favoured by a chalky soil. Experiments with the cultivated plant showed that the plant becomes most rich in active principles at the period of flowering and that the proportion is

maintained in the fruiting season; further, that there is a simultaneous development of alkaloidal matter in the root and in the leaf, the former not being exhausted to strengthen the latter. A slight discussion followed, in the course of which Mr. HOLMES remarked that he had observed that belladonna grows more luxuriantly in calcareous soils, which might perhaps account for its being richer in alkaloid. At the close of this discussion the Conference adjourned to luncheon, which was provided in an adjoining room.

On resuming, the first paper read was entitled "A New Styptic of Indigenous Growth," and contained some observations of Professor QUINLAN upon the hæmostatic properties of the leaves of the *Plantago lanceolata*, or ribgrass. Notwithstanding the form of its title, the paper contained some interesting quotations from SHAKSPERE and CULPEPPER, proving that the ribgrass long ago had a great reputation as a styptic. Professor QUINLAN exhibited some pharmaceutical preparations of the plant, but it would appear that for external application the dried leaves are effective or the fresh leaves in a paste such as would be produced by mastication. It is not quite clear in what manner the leaf acts, but some experiments appeared to show that it is devoid of any kind of tannin, and it was suggested by Professor TICHBORNE that if there were an astringent principle present it might be allied to the catechuic acid compounds. Mr. BORLAND said that *Plantago lanceolata* had long been used in the district in which he lived to stanch the bleeding of wounds, but he had hitherto thought that it was merely because they formed a convenient covering of a wound.

A *résumé* was then given by Mr. W. A. SHENSTONE of "Some Experiments on English Oil of Lavender," which had been undertaken to test statements made by foreign chemists to the effect that oil of lavender sometimes deposits in cold weather a camphor, identical with common camphor, and that the oil contains a hydrocarbon boiling at a very high temperature (200°–210° C.). Mr. SHENSTONE was unable to confirm either of these statements, the oil used by him evidently not containing any notable quantity of crystalline constituents, whilst the distillate collected about the temperature mentioned contained a large amount of oxygen. It would also appear from the independent experiments of the author and M. BRUYLANT that the English and foreign oils of lavender differ very considerably in the amount of terpene which they contain. It may be remarked, in passing, that Mr. SHENSTONE'S *résumé* was evidently appreciated by the audience, and it is worth consideration whether it would not be better, as a rule, to summarize papers containing a large number of details that cannot be followed in the reading and to present the general results in such a form that they can be readily grasped, and, if necessary, discussed. No person in the habit of attending scientific meetings like the Conference can have failed to observe the weariness that becomes evident in the audience during the reading of even valuable papers, the drift of which is obscured by the multitude of details.

Next Mr. PARKER read a meritorious paper upon "Terpin Hydrate: its Preparation and Crystallography," which had been suggested by the occurrence of some crystals in a jar of furniture oil, supposed to have been compounded chiefly of linseed oil, turpentine, butter of antimony and methylated spirit. The author does not seem to be aware that the formation of such crystals in furniture polish is by no means a new experience; but it may be mentioned that in the early days of the School of Pharmacy, Bloomsbury Square, the conditions under which the formation of such crystals took place was the subject of many experiments in the laboratory, though without any satisfactory result being arrived at. Besides an elaborate description of the crystallography of terpin hydrate, the paper contained details as to its preparation and physical properties, and it mentioned the interesting fact that it is probable that terpin hydrate may be made to yield several aromatic oils by the action upon it of dehydrating substances under suitable conditions.

The next paper was on "A New Method of Making the Volumetric Solution for Estimating Hardness of Water," by Professor TICHBORNE. The novelty consists in the use of an oleate of soda, the preparation of which he describes, in the making of the soap solution. Dr. SYMES then read "Some Notes on Brazilian Drugs," in which he described a gum derived from the *Acacia Angico*, known in Brazil under the name of "resin de angico," and said to be useful for chest complaints. Another drug referred to was a species of elemi, named "almesca," differing in some respects from the elemi of commerce. The last drug described was a bark named "casca de guassatunga," from which in Brazil an alcoholic tincture is prepared said to be useful in the treatment of snake-bites.

The chair was now taken by Mr. GROVES, whilst a paper was read by the President, entitled "Half-an-hour with a Few Sheets of the New Pharmacopœia of the United States." The sheets upon which the remarks were based had been placed at the disposal of Professor ATTFIELD by the courtesy of Professor P. W. BEDFORD, President of the American Pharmaceutical Association, who is also a member of the United States Pharmacopœia Committee. The work is printed in large octavo, and the division into the two classes of "Materia Medica" and "Preparations," which obtains in the last edition, is abandoned in favour of one simple alphabetical arrangement like that of the British Pharmacopœia. The system of chemical nomenclature advocated by Professor ATTFIELD is again followed, and the author of the paper justly claimed that this proved that it was practicable and serviceable in the medicine and pharmacy of an English-speaking people. The old

system of weights and measures is abandoned and the formulæ are, as a rule, expressed in parts by weight, but in cases where particulars of volume as well as of weight are required the metric decimal system is employed. The Pharmacopœia opens with a new class of preparations, termed "Abstracts," which are alcoholic extracts mixed with sufficient sugar of milk to make one part of the preparation represent two parts of the original drugs. The class includes abstracts of aconite, belladonna, conium, digitalis, hyoscyamus, ignatia, jalap, nux vomica, podophyllum, senega and valerian. A list of the additions and omissions was given, which cannot be referred to here further than to notice that "aconitia" is omitted, notwithstanding the assistance afforded to the Pharmacopœia Committee by Dr. WRIGHT in respect to a definition of that substance. Further, the doses of drugs are now given, temperatures are stated in Centigrade degrees with Fahrenheit equivalents in brackets, chemical formulæ are inserted as in the British Pharmacopœia, and the molecular weight is appended to each formula. The interest excited by this paper was increased by the fact that Professor REDWOOD took the opportunity of stating that the preparation of a new edition of the British Pharmacopœia is now in contemplation. He said that he had little doubt that in it the same system of nomenclature would be adopted as in that of the United States, but he spoke with less certainty as to the adoption of the plan of indicating quantities in parts by weight, although he approved of the system and had himself worked it out years ago. He remarked that with respect to the Pharmacopœia of this country a greater conservatism was exercised by the Medical Council than by the body that controlled the United States Pharmacopœia, since it did not introduce any unproved remedies. The reading of this paper brought the first day's business to a close.

In the evening a visit was made to the picturesque ruins of Netley Abbey by upwards of sixty members and visitors, carriages having been provided by the Local Committee. The pleasure of the excursion was slightly marred by atmospheric influences, the splendid view of Southampton Water and the opposite coast being nearly destroyed by the driving rain and mist; but notwithstanding this untoward circumstance the trip proved a very enjoyable one, and much interest was excited by the ruins.

On Wednesday morning the proceedings were resumed by the reading of a paper on "Some Reactions of Arsenic," by Messrs. NAYLOR and BRAITHWAITE. The first portion of the paper was devoted to the results of some experiments made to test a statement of M. PATROUILLARD, and introduced into some text-books, to the effect that arsenic acid is easily reduced to arsenious acid by the action of oxalic acid. The authors failed to obtain any confirmation of this statement and expressed an opinion that oxalic acid exerts no reducing action under the conditions described by M. PATROUILLARD. The remainder of the paper was devoted to an account of the method followed in employing the copper-test, which is based upon the fact of the solubility of cupric arsenate in the double tartrate of potassium and sodium, and to a description of the decomposition which takes place between arsenious acid and mercuric salts.

The next paper read was entitled "Some Results of the Action of the Digestive Ferments on Drugs," and was by Mr. G. BROWNEN. It described the effect produced by solutions of the gastric ferment and pancreatic solutions upon a number of drugs and their preparations. The results obtained suggest that this field of investigation will prove not only interesting but important to the physiologist, though evidently the value of such experiments will be increased in proportion as the conditions under which they are performed resemble those which occur in the human economy. It was pointed out in the discussion which followed that those conditions are very difficult to imitate, especially such of them as obtain in cases of disease, and it was objected by Mr. PLOWMAN that the temperature at which the experiments were conducted (50° C.) exceeded that of the human body. Some little amusement was caused by the prohibition by the President of any reference to such a subject as "vital force" and by the difficulty some of the speakers experienced in their attempts to avoid the veto.

Mr. E. M. HOLMES commenced his "Remarks on the Root of *Aconitum Napellus* and Allied Species" by pointing out that although aconite has long been in use in medicine, and is recognized as one of the most powerful of medicinal agents, its internal administration in this country is not so great as might have been expected. This he considers to be possibly due to variation in the strength of official preparations, and without attributing this variability altogether to the non-recognition in the Pharmacopœia of well-known facts, he says that it appears certain that the requirements of the Pharmacopœia might be complied with and yet preparations of very variable strength be the result. He points out that the figure of the root referred to in the Pharmacopœia is totally inadequate to distinguish the root of *Aconitum Napellus* from that of other less poisonous species, and that the roots imported from Germany are collected by peasants not possessed of any botanical knowledge and sold without any guarantee as to the time of their collection. The difficulty is increased by the fact that the numerous aconites are closely allied, the varieties running one into another, whilst a complete series of the members of the genus is hardly to be found for reference in any botanical garden or museum. He, therefore, considered it worthy of inquiry whether the aconites available for pharmaceutical preparations might not be characterized for practical purposes by the effect produced by them

when chewed. He found that the roots of several species did not cause a tingling sensation upon the tongue, including some plants which presented the specific characters of *Aconitum Napellus*, though easily distinguishable from it by habit. But all the aconites in which this variation occurred were observed to flower later than the typical *Aconitum Napellus*. He expresses the opinion, therefore, that the only way to secure aconite of good and uniform quality is to limit the official drug to home-grown aconite, flowering in May and June and gathered while the plant is in flower. He remarks, in conclusion, that aconite is very easy to cultivate and that, considering the small quantity used, there is no reason why any chemist who has a small piece of garden should not grow his own aconite root. Contrary to what might have been expected after the reading of so practical a paper, no discussion followed, and it may be remarked that the comments made upon the papers read at this meeting, as a whole, were far fewer than in previous years.

"Ammoniated Extract of Ergot and a Process for its Preparation" was the title of the next paper read, which was contributed by Mr. A. W. Gerrard. The process consists in macerating 10 parts of crushed ergot for eight or ten hours with frequent stirring in 50 parts of cold water containing ½ per cent. of strong solution of ammonia, straining through flannel, washing the ergot from time to time with more ammoniacal water till exhausted, evaporating the strained liquor to five parts (any scum or fat arising to the surface being removed), treating the cooled extract with an equal volume of aromatic spirit of ammonia, decanting the clear portion after subsidence, filtering the remainder through felt or flannel and washing the residue with sufficient spirit to bring the volume of the extract to ten parts. One part of the extract, which thus prepared is darker in colour than the ordinary form, contains the soluble matter of one part of solid ergot; the average specific gravity is 1000, and the dose is the same as that of the ordinary liquid extract. The advantages claimed for the preparation are that the ammonia not only by its solvent power insures a complete exhaustion of the active principles of the drug, but by its presence in the medicine induces a rapid action by acting as a nervous stimulant. In the discussion which followed it was suggested that the ammonia by forming a soap took up a portion of the oil present in ergot, and thus facilitated the permeation and consequent exhaustion of the drug. The official formula found several defenders, Mr. Greenish being of opinion that water extracts all the active principle from ergot if the oil be previously removed. On the other hand, Dr. Quinlan said that in practice he had found ammonia in a preparation of ergot to be useful as a corrective.

Mr. Symons then read a paper on "Tumefaction as an Aid to the Identification of the Varieties of Maranta Starch." It contained the results of experiments made by treating different starches with solutions varying from 0·5 to 1·5 per cent. of caustic soda and also by submitting them to various degrees of heat until tumefaction took place. He found that when potato, oat, Natal, tous-les-mois, wheat, Bermuda, sago, maize, cassava, St. Vincent, and rice starches were treated with caustic soda for ten minutes, they required for their complete tumefaction solutions increasing in strength in the order mentioned, from potato with a 0·8 solution to rice which required a 1·3 solution. When tumefied by heat and arranged according to the degree of temperature required, the order of the starches was nearly the same, with the exception of oat and cassava. It is worthy of remark that when using the alkaline method of tumefaction the order of the starches bears out a conjecture recently put forward in this Journal by the author, that the higher the temperature at which a starch grows the higher is its point of tumefaction.

The next paper read was on "The Purity of Commercial Salts of Gold," by Mr. F. W. Branson. It gave the result of the examination of some fifteen-grain tubes of commercial salt of gold, eight of which were found to be correct within reasonable limits, whilst four showed a deficiency of 8 per cent. in weight or 5 per cent. in metal. The latter, although obtained from a reputable house, bore neither trade mark, seller's name nor guarantee label.

In the paper next read, on "The Iodides of Bismuth," by Messrs. F. W. Fletcher and H. P. Cooper, the authors described a new compound of bismuth, a very basic yellow iodide, represented by the formula $BiI_3.5Bi_2O_3$ or $3BiOI.4Bi_2O_3$, met with whilst testing metallic bismuth for lead.

The last paper read before the adjournment for luncheon was a note on "Microscopic Organisms in certain Inorganic Solutions," and contained the details of some experiments made as to the formation of a green vegetable growth in bottles containing solutions of sodium phosphate, magnesium phosphate, and calcium sulphate, kept in the laboratory of the Yorkshire College of Science.

The Conference reassembled at 2.30 p.m. when a paper by Mr. D. B. Dott on "The Solubility of Morphia Salts" was read. It consisted principally of an adverse criticism of two papers on a similar subject by Professor Power and Mr. J. U. Lloyd, and incidentally the author mentioned that he is engaged upon the compilation of a table of the solubility of morphia salts, the determinations being made at 60° F. In discussing this paper Mr. R. H. Parker suggested that it would be advantageous to establish standard conditions under which solubilities should be taken, since the solubility of many substances is much affected by varying circumstances. Mr. J. Williams said that he looked upon solubility as being closely associated with the power of crystallization, illustrating his remark by a reference to the compounds of caffeine recently described

by M. TANRET, which he does not consider to be definite chemical compounds, but mixtures. Mr. P. W. SQUIRE also pointed to the necessity of distinguishing between the point of solubility and the crystallizing point.

In some "Notes on the Pharmacy of Cinchona," Mr. R. W. GILES called attention to the unsatisfactory results that have followed the "fearful deterioration of Calisaya bark," both pharmacy and medical practice having been prejudiced through the consequent substitution of quinine for pharmaceutical preparations of the bark. He recommends that all pharmacists should keep in stock Indian or other non-official bark of sufficient alkaloidal value and that when opportunity offers they should educate the medical profession to the use of it. He considers that the standard adopted for the cinchona of pharmacy should be an alkaloidal and not a quinine standard, that it should be a mean and not an extreme one, and that it should admit barks from all sources. Further, he described a process for the determination of the alkaloidal value of cinchona bark which, he said, though simple and easy of manipulation, gives results near enough for pharmaceutical purposes. He expressed a preference for a fluid extract as a pharmaceutical preparation, but said that a fluid extract of cinchona worthy of its name was still a desideratum. In the discussion of this paper, Mr. WELCOME recommended that the standard of a pharmaceutical bark should be fixed at 2 per cent. of quinine with a proper proportion of the other cinchona alkaloids. Mr. SOUTHALL spoke favourably of the decoction, which he said was largely used in the Birmingham district, and Dr. SYMES said it was also a favourite preparation in Liverpool. On the other hand, Mr. EKIN reminded the Conference that he had found the decoction to be the preparation weakest in alkaloid. The discussion afforded Mr. HAMPSON the opportunity of saying that changes in the Pharmacopœia would be best effected, when necessary, under the advice of practical pharmacists, and that the Pharmaceutical Society of Great Britain or the British Pharmaceutical Conference ought to be represented in the Pharmacopœia Committee in virtue of legal enactment.

"A Note on the Action of Glycerine upon some Salts of Iron," by Mr. G. F. SCHACHT, described the results of some experiments arising out of an alteration observed in a mixture made from the following prescription:—"Tinct. ferri perchloridi, ʒiss; glycerini, ʒvj; aquæ, ad ℥vj." The mixture, when first prepared, was of a pale sherry colour and possessed an astringent metallic taste; but the colour afterwards nearly disappeared and the taste became sweet and metallic, but not astringent. The change was due to the reduction of the iron from the ferric to the ferrous condition and experiments showed that this reduction takes place in the presence of ethyl alcohol, glycerine, and probably some other alcohols. Conversely, glycerine appears to retard though not absolutely to prevent the oxidation of the proto-salts. The President said that this action of alcohol upon a per-salt of iron had been long known, an ethereal spirit of chloride of iron prepared in this way having been formerly official in a continental Pharmacopœia.

In a "Note on a Reaction of Glycerine and Polyhydric Alcohols," Mr. W. R. DUNSTAN recorded the observation that the acid solution obtained by the addition of glycerine to an aqueous solution of sodium biborate becomes alkaline when heated. The reaction is also given by many other polyhydric alcohols and by certain sugars.

The interest excited by the introduction of Professor BARFF'S "Boro-glyceride" has induced Mr. D. HOOPER to make some experiments upon the "Solubility of Boric Acid in Glycerine." He finds that at zero 100 parts of glycerine dissolve 20 parts of boric acid, that at 100° C. the quantity dissolved is increased to 72 parts, and that between these two temperatures the solubility is represented by an almost straight line.

Mr. B. S. PROCTOR, having been somewhat sceptical as to the cause of the non-appearance of the results of oxidation in a commercial sample of liquor of iodide of iron, was induced to examine it, and the results furnished the subject of the next paper read. He proved the presence of phosphoric acid by its separation as ferric phosphate and that of oxalic acid by its separation as ferrous oxalate. The liquor also did not contain the quantity of iodide of iron required to make a syrup of full strength, when used according to the directions accompanying it. At the conclusion of his paper Mr. PROCTOR somewhat cynically suggested that if any pharmacist feels impelled to any other expedient than that of keeping his solution in contact with an iron wire he had better at least know what he is doing, and add the adulterations himself rather than buy the liquor ready adulterated, not knowing what it contains. Mr. FLETCHER expressed a doubt whether any manufacturer who had a reputation to lose would add such a substance as oxalic acid, and, referring to the acidity of the liquor which had been mentioned by Mr. PROCTOR, said that it might be due to free hydriodic acid which is always formed. The usual *pro* and *con.* statements with respect to the permanence of syrup of iodide of iron and the effect produced by iron wire or light were made by different speakers, and Professor TICHBORNE expressed an opinion that a frequent cause of failure was that the heat was not continued long enough in making the solution of iodide of iron to sufficiently remove the hydriodic acid formed.

A "Report on the Strength of Commercial Samples of Tincture and Liquid Extract of Opium," by Mr. J. WOODLAND, was then read. Fourteen samples of tincture had been examined, and taking the percentage of morphia present as a criterion,

eight of them appeared to have been prepared from opium exceeding in morphia strength the Pharmacopœia standard; the other six were more or less deficient. Of ten samples of liquid extract of opium none reached the standard, and in one or two cases the percentage of morphia was very low.

The last paper read was a "Report on the Purity of Commercial Samples of Silver Salts," also by Mr. WOODLAND. It stated that caustic points had been found to contain from 25 to 36 per cent. of potassium or sodium nitrate, crystals of silver nitrate from none to 19 per cent. of the same diluents, and oxide of silver from 13 to 26 per cent. of impurities. It was remarked by the President that potassium nitrate is avowedly added in the preparation of caustic points in order to give them greater toughness, and Mr. J. WILLIAMS said that nitrate of lead is used for the same purpose. Both Mr. WILLIAMS and Mr. NAYLOR expressed surprise at the statements with respect to silver oxide and said that it did not usually contain more than 1 or 1½ per cent.

The next business of the Conference would have been to decide as to the place of meeting in 1883; but the President having stated that it was not yet settled what town should be visited by the British Association,—the arrangement with respect to Oxford having fallen through,—it was agreed to leave the decision in the hands of the Executive Committee.

The election by ballot of officers for 1882–83 then took place with the following result:—

President.—Prof. Attfield, Ph.D., F.R.S., F.I.C., F.C.S.

Vice-Presidents.—M. Carteighe, F.I.C., F.C.S., London; J. R. Young, Edinburgh; C. Umney, F.I.C., F.C.S.

Treasurer.—C. Ekin, F.C.S., Hounslow.

General Secretaries.—F. Baden Benger, F.C.S., Manchester; S. Plowman, F.I.C., London.

Other Members of Executive Committee.—Alexander Kinninmont, F.C.S., Glasgow; J. C. C. Payne, Belfast; W. A. H. Naylor, F.C.S., London; R. Chipperfield, Southampton; P. W. Squire, F.L.S., F.C.S., London; G. S. Taylor, F.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton; F. W. Fletcher, F.C.S., London.

Auditor.—James Spearing, Southampton.

Nothing now remained for the Conference to do but to record its sense of indebtedness to those friends who had contributed in various ways to make the meeting a success. First, the cordial and well-deserved thanks of the non-resident members were accorded to the Local Committee, and especially to Messrs. RANDALL, CHIPPERFIELD and DAWSON, for the successful way in which they had carried out the arrangements. Then a vote of thanks was passed to General COOKE, Director-General of the Ordnance Survey Department, for his kindness in affording facilities to the members to visit the Ordnance Survey Offices and inspect the operations going on there. Last of all came an enthusiastic vote of thanks to the President, for his conduct in the Chair, and the members of the Conference then separated, not without some misgivings as to the weather for the evening Excursion.

Any fears, however, which might have been entertained during the storm which raged on Wednesday night, as to the condition of the weather on the following day, were fortunately dispelled. The morning was faultless; the sun brilliant and the air delightful. Before half-past eight, the hour fixed for starting, members of the Conference were making a forced march to the pier-head, many, judging from an indescribable expression of "goneness" in their features, having evidently sacrificed breakfast to a heroic determination to be punctual. The steamer engaged for the trip was one of the finest boats in the Isle of Wight Company's service, and about one hundred and twenty excursionists, including a fair proportion of ladies, were on board when, a little before nine o'clock, the signal for departure was given. The run to Ryde was most enjoyable, affording as it did, glimpses of many objects of interest; Netley Hospital, with its magnificent façade, and the ruins of the fine old Abbey close by, well contrasted the spirit of the Past and the Present, and Osborne, so delightfully situated amidst the peaceful beauty of its surrounding, evidenced the gentle spirit of its Royal occupant.

Ryde was reached at 10·30, where a train was waiting to convey the party to Brading. Alighting here, a pleasant stroll through lanes and fields, rich in spoils for the botanists, brought the visitors to the remains of the Roman Villa. An inspection of the mosaic floors, some of which are in very perfect condition, and the many archæological treasures which have been turned up during the excavations, detained the company here until 12·30, when train was taken to Ventnor.

A short distance from the town, on the Bonchurch Road, a substantial luncheon was served on the lawn in front of the residence of Captain ROACHE, who had kindly thrown open his grounds for the reception of members of the Conference. The majority of the party then made their way through Bonchurch to the Landslip. The magnificent scenery of this spot is too well known to need description; suffice it to say that the expanse of sun-illumined sea on the right hand and the solemn grandeur of the grey crags to the left, intermingled with the varied tints of the luxurious foliage, made up a scene which by those who witnessed it for the first time will never be forgotten, and which by those who had already seen it many times before will ever be remembered with increased delight.

On the road along the cliffs to Shanklin stands the private residence of Mr. GIBBS, of Ryde, and at this point a pleasant surprise awaited the excursionists. Mr. GIBBS, gracefully assisted by his wife, welcomed into his house successive detachments of the party as they arrived; and beneath his hospitable roof every kind of comfort and refreshment was set before them. In the dining room were choice wines and fruits, and in the drawing room, tea, coffee, and other light refreshments. Coming as it did so unexpectedly, and dispensed so courteously and generously, Mr. GIBBS's hospitality constituted one of the most delightful incidents of the trip.

After passing through the village of Shanklin and visiting its celebrated Chine, the party returned by rail to Ryde, and thence by steamer to Southampton, where, at 7.30, high tea was served at the Royal George Hotel. Numerous speeches followed, and at a late hour the company dispersed, unanimous in the opinion that a pleasanter excursion had never been spent by the Conference.

Amongst the members of the Local Committee singled out for special thanks were Mr. RANDALL, the courteous Chairman, Mr. DAWSON, the assiduous Honorary Secretary, and last, but not least, Mr. CHIPPERFIELD, the energetic "Acting Manager."

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The Nineteenth Annual Conference commenced its sitting at the Watts Memorial Hall, Vincent's Walk, Southampton, on Tuesday morning, the 22nd inst, at 10.30 a.m., under the Presidency of Professor Attfield, Ph.D., F.R.S., F.I.C., F.C.S. During the Conference about one hundred and twenty persons signed the book.

Welcome to the Conference.

Mr. W. B. Randall (Southampton), Chairman of the Local Committee, said he was deputed by his brother pharmacists to say how pleased they were to see the British Pharmaceutical Conference meet in Southampton. The gentleman who conveyed the invitation to the Conference at York last year mentioned certain disabilities under which they laboured in undertaking this duty, but notwithstanding that, with the help of their brethren in the neighbourhood and of some friends at a distance, they trusted they had been able to make such arrangements as would make members of the Conference comfortable and minister to their enjoyment during their visit. They could not say at Southampton that they were favoured by nature with those mineral treasures which added so greatly to the population and wealth of the localities where they were found, but they might boast, perhaps more than some of those localities, of the beauties of nature, and he ventured to think that this was as good a part of the country to work in, and to enjoy life in, as those parts where there might be more mineral wealth. It was quite certain that the monks of old thought this locality a good one, and they were not bad judges, for they put up Netley Abbey, of which the stately ruins might still be seen. The Government of our own day had much the same feeling, for they erected Netley Hospital close to the ruins of the Abbey. The old Norman kings too must have thought something of the South of England, for they made their hunting grounds in the New Forest, and Her Gracious Majesty the Queen and her lamented Consort appeared to have thought the same when they chose Osborne as one of their royal residences. He might say something too, if time permitted, about the historic associations of Southampton. It was there, he believed, that Canute gave that celebrated rebuke to sycophancy which all would remember, and that lesson in reverence which was now-a-days, he believed, equally needed. In that neighbourhood too, in his early days, ran about a man who had taught some amongst them the close observation of nature, when he recommended them to imitate the industry of the busy bee, and who also taught many of them their first lessons in logic, for his handbook on that science had the honour for some time of being the text-book in one of the universities. He alluded to Dr. Watts, after whom the building in which the Conference was assembled had been called, and on whose father's garden it stood. He would detain them no longer from the address they were anxious to hear, but in the name of the pharmacists of the south-western district, including those residing in the garden of England across the Solent, he bid the British Pharmaceutical Conference welcome to Southampton.

The President, in the name of the Conference, thanked Mr. Randall for the kind words of welcome he had uttered. He begged also to express the hope that, in return, the meeting of the Conference might be the means of doing some good to the pharmacists of Southampton and the district.

Reception of Delegates.

Mr. F. B. Benger (General Secretary) then read the list of delegates from various societies, who were collectively welcomed by the President.

The following is a list of those present:—

From the *Pharmaceutical Society of Great Britain.*—Mr. S. R. Atkins (Vice-President); Messrs. F. Andrews, T. Greenish, F.C.S., F.R.M.S., R. Hampson, W. D. Savage, G. F. Schacht, F.C.S., P. W. Squire, C. Symes, Ph.D., F.C.S. and J. Williams, F.I.C., F.C.S.

From the *North British Branch of the Pharmaceutical Society.*—Messrs. Borland and J. B. Stephenson.

From the *Pharmaceutical Society of Ireland.*—Professor Tichborne, Ph.D., F.I.C., F.C.S. (President); Messrs. W. N. Allen, H. Bennett and Payne.

From *Birmingham.*—Mr. Southall.

From the *Brighton Association of Pharmacy.*—Messrs. Padwick and W. D. Savage, J.P.

From the *Bristol Pharmaceutical Association.*—Mr. G. F. Schacht (President).

From the *Liverpool Chemists' Association.*—Mr. Mason and Dr. Symes.

From the *Leicester Chemists' Assistants and Apprentices' Association.*—Mr. J. W. Clarke.

From the *London Chemists' Assistant's Association.*—Messrs. W. A. Wrenn (President), and C. E. Stuart, B.Sc.

From the *Manchester Chemists and Druggists' Association.*—Messrs. F. Baden Benger, F.C.S., and A. H. Jackson, B.Sc.

From the *Sheffield Pharmaceutical and Chemical Society.*—Mr. J. Preston (President).

From *York.*—Messrs. Clark and Dresser.

Mr. Benger then read the report of the Executive Committee, as follows:—

Report of the Executive Committee.

Since the last general meeting of the Conference at York, your Committee have met on several occasions in London, chiefly for the transaction of business connected with the publication and distribution of the 'Year Book,' the issue of the Blue Lists and other circulars, the collection of members' subscriptions, and the organization of the present meeting.

At a meeting held in December, Mr. Siebold was reappointed editor of the 'Year Book' for 1882. The manuscript of the forthcoming volume, so far as it can be completed up to this date, has been placed on the table. There remain to be added to it the Introduction, the Bibliographical section, the Transactions of the Conference at this meeting, and the Index.

Members will have observed that in the 'Year Book' for 1881 the various alterations and improvements alluded to in the last Report of your Committee have been carried out. A new section, "Bibliography," comprising titles of books, pamphlets, etc., on chemistry, botany, materia medica, pharmacy, and allied subjects, published between July 1, 1880, and June 30, 1881, has been added. The abstracts are somewhat more condensed than in former years and are more numerous, one of the lists of members—that in which the names were classified under those of the cities and towns in which they reside—has been omitted, and better paper has been employed. The issue of a general index has been postponed for financial reasons.

It being very desirable to enlist the sympathies and secure the friendly co-operation, in Conference matters, of colonial pharmacists as far as possible, steps have been taken to place the Blue List of subjects suggested for investigation in the hands of the principal pharmacists residing in some of the British Colonies. In carrying out this arrangement, the assistance of local Pharmaceutical Associations has been kindly afforded. Your Committee have already been informed of the distribution of the papers sent to Victoria, and twenty-one applications for membership have already been made in consequence.

Letters have been received from Mr. Bosisto, the President, and Mr. Shillinglaw, the Secretary of the Victoria Pharmacy Board, expressive of the cordial interest taken by them in the proceedings of the British Pharmaceutical Conference, and offering to distribute, at any time, Conference circulars free of cost.

One application only for a grant in aid of research

has been made, that of Mr. Alfred H. Jackson, B.Sc., of Manchester, The sum of £10 has been placed at this gentleman's disposal for the purchase of materials wherewith to conduct an examination of the essential oils of cinnamon and cassia, with a view to discover some chemical or physical distinctions. Mr. Umney was good enough to undertake the distillation of these oils from the respective barks, thereby guaranteeing their purity, and Mr. Jackson will present a first report to the present meeting. Mr. Gerrard, to whom a grant was voted last year, has continued his investigations on the relative values of wild and cultivated belladonna, and on the activity of the various parts of the plant, and will furnish a further report.

Mr. H. G. Greenish, who was also the recipient of a grant last year to aid his investigation of the principles of *Nerium Oleander*, writes, "The publication of the results that I have hitherto obtained would probably lead only to confusion, as they involve the modification, to a certain extent, of statements made in a 'Preliminary Note,' published in the *Pharmaceutical Journal* some time since and are in themselves but incomplete." The reception of Mr. Greenish's report is therefore postponed.

Your Committee take the opportunity of again reminding members that there are funds ready to be placed at their disposal, to defray the cost of materials used in the investigation of subjects suitable for Conference Reports, and they cannot refrain from an expression of disappointment that so few avail themselves of this assistance.

Your Committee regret the loss of the valuable services of one of the Honorary General Secretaries. Mr. Carteighe, having been elected President of the Pharmaceutical Society of Great Britain, felt it to be his duty to that Society to resign the position as Secretary he held with us.

Mr. Sidney Plowman, F.C.S., having been asked by his fellow members of the Committee to act provisionally as an Honorary Secretary until an appointment could be made, has assented to do so.

Fifty-seven gentlemen have been elected members since the last annual meeting.

Mr. Ekin (Treasurer) read the statement of accounts for the past year, which is printed on page 169.

The President, in moving the adoption of the report, said he trusted the Conference would be satisfied with the work of the Committee during the year. He would remark, in reference to the small deficit which marked the operations for the year, that the Committee did not seek to save money; it desired to spend every penny received. In past years, more by accident than anything else, the Conference had accumulated £300 or £400, which was quite sufficient to stand between it and bankruptcy, and he should be quite satisfied if that amount remained to its credit. As to whether in any year there might be a deficiency of a few pounds, or an increase of a similar amount, need not cause much trouble. If anyone had any misgivings on this point, however, he might reflect with satisfaction that very shortly a post-office parcels post would be in operation, which would save at least 2*d.* per volume in the delivery of the 'Year-Book.' But when the Conference came to ask the registered chemists and druggists of the country who were not already members of the Conference to become so, he thought there would be such an increase of membership as would remove any possible difficulty there might be in the way of finance. With regard to the general index to the 'Year-Books,' to workers at pharmacy it would be a great advantage to have a general index to the whole of the volumes, and two years ago it was suggested that such a general index should be published. The Committee had considered the matter carefully, and were somewhat surprised to find that the production of such a work would cost a considerable sum, and just now they did not happen to have funds in hand for that purpose. He had no doubt that in the course of a year or two such funds would be forthcoming, and one of the first objects to which they would be applied would be the production of the general index.

Mr. W. D. Savage (Brighton) seconded the motion, which was then put and carried unanimously.

The Bell and Hills Fund Gift of Books.

Mr. Ekin said he was happy to be able to state that the Local Committee saw its way to accept the gift of books from the Bell and Hills Fund, and to make arrangements by which they would be available to all the chemists of Southampton. He regretted that it had not been decided a little earlier, so that the books might have been presented on the spot; but the selection had been made, and they would shortly be sent to Southampton.

Mr. Randall said the pharmacists of Southampton accepted this gift with very much pleasure and thankfulness, and they hoped it might lead some day to their having their own place in which to keep and use these books, and even to something beyond that. If it did, it would have done them considerable good, and he must say, in his opinion, the donors of this gift had done great good by giving such practical lessons in the value of a good library.

Mr. Sidney Plowman (General Secretary) then read the following letter from Professor P. W. Bedford, President of the American Pharmaceutical Association:—

"Professor John Attfield, Ph.D.,
"President,
"British Pharmaceutical Conference.

"Dear Sir,—Allow me to congratulate yourself and the Conference on the assured success of the coming meeting at Southampton, and to express my regret that I have to do by letter what I would far rather do in person. I had hoped that ere this I should have had the pleasure of attending one of the gatherings of the British Pharmaceutical Conference, but it is still one of the prospects of the future.

"I trust that in numbers it will be the largest meeting yet held; in papers, most numerous; in discussions, most profitable; in social pleasure, the most enjoyable.

"I recently forwarded to you proof sheets from the corrected plates of the first ninety-six pages of the text of the forthcoming U.S. Pharmacopœia; and, with this, I have the pleasure of sending the succeeding forty-eight pages; all that are as yet in presentable condition.

"It will serve to show yourself and friends of the British Pharmaceutical Conference, that it will be a work worthy of the labour bestowed upon it.

"It is the only copy that has gone outside our Committee, and I take pleasure in sending it to one that has honoured his own land by his worthy work in the cause of pharmacy, and in our own land is as well known by his scientific labours in our profession. Another tie exists: it is the remembrance of the practical sympathy and interest which years ago was extended to those of our profession who saw their College of Pharmacy vanish in the flames.

"The annual meeting of the American Pharmaceutical Association follows close after that of the Conference. I trust that it may be possible for us at that meeting to extend a cordial welcome to some of our fraternity from England.

"May the British Pharmaceutical Conference ever prosper, ever be an active promoter of the true welfare of our profession, and stand as an able exponent of the best talent of pharmacy in England.

"Very sincerely yours,
"P. W. Bedford,
"*President,*
"*American Pharmaceutical Association.*"

Letters expressing regret at not being able to be present had also been received from Mr. Richard

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1882.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

Dr.	£	s.	d.
To Balance in hand	282	9	10
„ Sale of Year-Book by Publishers	26	6	8
„ Sale of Year-Book by Secretary	5	12	6
„ Advertisements, 1879 vol.	0	12	0
„ „ 1880 vol.	8	10	0
„ „ 1881 vol.	103	6	6
„ Subscriptions from Members	661	7	3
July, 1881. To Dividend on £250 Consols	3	13	5
1882.			
Jan. „ „ „	3	13	5
Feb. 15. To interest on deposit	3	5	4
	£1098	16	11

Cr.				£	s.	d.
By Expenses connected with Year-Book:—						
Printing, binding, and distributing	£467	0	0			
Editor's Salary	150	0	0			
Advertising and Publishers' charges	30	7	8			
Foreign Journals	3	19	0			
				651	6	8
„ Grants in aid of Research				20	1	11
„ Secretary's Salary				100	0	0
„ Printing and Stationery				37	12	2
„ Sundry Expenses				3	13	3
„ Postage				44	7	3
„ Expenses of York Meeting				18	7	4
„ Secretary's Expenses, York Meeting				6	0	0
„ Balance at Bank	£212	9	9			
„ Cash in Secretary's hands	4	18	7			
				217	8	4
				£1098	16	11

		£	s.	d.
Assets July 1st, 1882	Cash in hand	217	8	4
	Consols (stock)	250	0	0

THE BELL AND HILLS FUND.

Dr.	£	s.	d.
1881. To Balance in hand	25	9	10
July. To Dividend on £350 Consols	5	2	10
1882.			
Jan. „ „ „	5	2	10
	£35	15	6

Cr.	£	s.	d.
By purchase of Books for York	10	10	6
„ Balance at Bank	25	5	0
	£35	15	6

		£	s.	d.
Assets July 1st, 1882	Cash in hand	25	5	0
	Consols (stock)	350	0	0

Audited and found correct, { RICHARD DRESSER, JAMES SPEARING } *Auditors.*

Reynolds, late President of the Conference, Professor Bentley, Messrs. Siebold, Umney, Stanford, Proctor, Young, Taylor, Thresh, Kinninmont, Frazer, and others.

The PRESIDENT then delivered his address as follows:—

THE PRESIDENT'S ADDRESS.

Pharmacy, in every country, has high duties to perform towards the State. The humble handmaid of medicine, she has to aid in maintaining that greatest of physical blessings, health; to aid in restoring those from whom that blessing is temporarily withdrawn; and to aid in soothing the life of those to whom that blessing will never come again. From earth and sea, and the living things they foster, pharmacy draws forth drugs new and old, gives them convenient shape, and distributes them to the community. Ever conservative, she searches the whole globe for supplies of medicaments, well known, well tried, and reliable; ever progressive, she searches the realms of nature and the regions of art for new materials wherewith to aid in combating disease and death. And when she has found her *materia medica*, she is unwearied in elaborating them, and unremitting in her endeavours to place them—by her possibly too competitive and too varied agencies—at the door of every dwelling in the land. Exhaustive research, careful manufacture, thorough distribution: these are the means by which her duties are fulfilled.

Is pharmacy performing those duties with the maximum of efficiency, either in the world generally or in any country particularly? Can she better search, better elaborate, better distribute? Can she in any way better meet the public demands made upon her? Can she better serve mankind, either herself directly, or through the profession of medicine? Is she performing any one of her duties better in some countries than in certain others; and, if so, can the international agencies for the exchange of pharmaceutical information be improved in character or wisely increased in number? Is a community best served, in the matter of pharmacy, by a large number of distributors of elaborated drugs, only a few persons being manufacturers of the preparations; or by a smaller number of distributors, each of whom makes his own preparations? Can the followers of pharmacy show the civilized States of the world, or show the governing body of any one State, how legislative enactments, new or extended, will better enable her to perform her high duties?

These are vital questions—vital to the health and therefore to the happiness of society, vital to pharmacy.

They are questions which may well form the subject of an address on the present occasion to a non-political society of pharmacists—the British Pharmaceutical Conference. For with one exception, the last, which will only receive such a passing notice as previous presidents have given to politics, the questions lie outside the area of legislation and administration. Lying also, as they do, outside the area of that original pharmaceutical research, the promotion of which is the chief object of the Conference, their consideration will form an agreeable relief to our deliberations on more technical matters.

They are questions which should strike home to pharmacists as individuals. For does any follower of pharmacy desire to promote even his own sole interest? Let him remember that the better he performs the duties the public require him to do, and have put him amongst his drugs to do, the greater will be his personal success. Let him reflect that he is only one member of the pharmaceutical body, and that in the degree in which he contributes to the welfare of the whole body does he promote his own welfare. Let him never forget, in short, that in pharmacy, as in every other walk of life, the highest self-interest is to be found in the forgetting of self. The requirements of the public have called him into existence; the requirements of the public maintain him in his position; only in proportion as he meets the requirements of the public will he promote his own interests or raise either himself or his calling.

Collection; Preparation; Distribution.—We must glance at the present condition of the machinery with which we perform our pharmaceutical duties before we can usefully consider possible improvement.

Collection.—In searching for supplies of the old and well tried natural drugs, pharmacy presses into her service natives of many climes and traders of many nationalities. In growing those drugs more or less artificially, she employs thousands of workers in all countries. In making her more strictly artificial saline remedies, she contributes to the support, is often the chief and sometimes the only support, of the chemical industries of Europe and America. And in the exercise of her demands for new remedial agents, she looks to the original researches and discoveries of the traveller, the botanist, the zoologist, the mineralogist, the scientific chemist. Her followers themselves largely conduct original research and discovery; they also largely foster research and discovery by banding themselves into Societies, Associations and Conferences, for the initiation of original pharmaceutical research, for the payment of expenses incurred in research, and for the free publication of the results of research.

Preparation.—To manipulate raw drugs and to manufacture compounded drugs is perhaps pharmacy's most special duty, the work which gives to pharmacy a distinctive stamp amongst man's many vocations. For it is her peculiar art to find the fittest form in which the animal product, the medicinal plant, or the crude mineral shall most directly, easily, and even pleasantly it may be, do the work it is intended to do. From the plant, animal, or mineral which observation or more minute research has shown to have medicinal value, pharmacy must carefully, step by step, and constantly testing progress, eliminate what is valueless, until she is able to say that a simple aqueous infusion or decoction contains all the activity of the raw material. Perhaps she finds that the active matter is only removable by more spirituous fluids, and hence produces a "tincture." May be she proves that the aqueous or spirituous fluid, without harm and with some advantage, may, by the boiling away of the solvent, be concentrated to a soft solid or "extract." Possibly, after much labour, she obtains from the crude drug one or more of the actual principles in which reside its activity; extracting such an alkaloid as quinine, such a substance as salicin, such a body as citric acid, such a salt as cream of tartar. Whether she always extracts the active principle or not, she must ascertain its properties in order that its presence may at any time be verified, or perhaps its purity be demonstrated, and in order that she may avoid mixing antagonistic or incompatible drugs when she distributes compounded drugs to the public.

To accomplish this manufacturing or manipulative work, either all or some of the followers of pharmacy must possess extensive knowledge. They must have sufficient preliminary education and mental training to enable them intelligently to study the scientific books they will have to master, and to comprehend the principles on which their work is based. They must as pupils give a few years to the acquirement of *materia pharmaceutica*, in order that they may be familiar with the standard physical characters, the general medical qualities, and the commercial importance of the many hundreds, if not thousands, of elaborated materials or mixtures of materials which they desire, sooner or later, to prepare for themselves. They must have some knowledge of botany, as well as of animal and mineral products, or they will not be able to judge of the raw materials with which they will have to deal. They must have a fair knowledge of the natural forces and of mechanics, or they will not be able to convert the raw drugs into preparations having the maximum of medicinal activity and convenience of form or shape, with the minimum of unpleasant flavour, odour and appearance. They must have a considerable knowledge of chemistry to enable them to judge of the

qualitative character of many drugs, and the quantitative character of most, the purity of the chemical substances which they purchase, the state of activity of preparations that have been long in stock, the compatibility or incompatibility of the components of mixtures they are called upon to prepare. A very large amount of such professional and commercial knowledge must be forthcoming somehow and somewhere from the pharmaceutical body for pharmacists rightly to do their duty to the State, as elaborators, or manufacturers, or compounders of drugs. Whether all pharmacists or only some should possess this knowledge, is a question yet to be discussed. The point up to which division of labour is desirable and beyond which it is undesirable, will be considered subsequently.

Distribution.—In every civilized State somebody must bring drugs within reasonable reach of every household. Very different agents perform this duty. There is, first, the pharmacist proper, who is not only a distributor but a manufacturer or compounder of the pharmaceutical preparations he distributes; the man who can warrant the purity and efficiency of every drug he distributes, either because he has tested it, or because he has made it himself from materials which his professional knowledge tells him to be trustworthy; the only pharmacist, therefore, who can offer a personal guarantee that the medicine prescribed by a physician will, as medicine, have the effect intended. There is next the druggist, who makes few, if any, compounds, trusting for their purity and efficiency to wholesale manufacturers, and who is able to test few, if any, of the articles supplied to him; but who has such experience of pharmacy as well fits him to supply a widespread demand for drugs—especially in suburbs of cities, and in the small towns and the villages of a country. Third in importance as a distributor of drugs, is the general practitioner of medicine, who, if he even has less knowledge of drugs than the druggist just alluded to, supplies an important demand, not only where pharmacists could do the work, but in outlying country districts remote from a druggist's shop of any kind. Fourthly, the distribution of drugs is effected, to some extent in the aggregate, in certain countries, by shopkeepers other than druggists; that is to say, by grocers, drapers, and such vendors, who admittedly know nothing about drugs, and who, except that they buy in bulk from the wholesale dealer or manufacturer, and retail in small quantity, sell the drugs in the state in which they are received. Lastly, drug distribution is, in certain countries, extensively accomplished by the agency of portable proprietary preparations termed "patent," though only so-called, now-a-days, in a *lucus a non lucendo* sense, the composition of most of them being a secret. These compounds pass from the producer to the consumer, either by the agency of the retail dealer, often but not always a pharmacist, or through the post-office. The maker of the patent medicines may or may not be a person having knowledge of drugs, and may not even reside in the country in which his articles are sold, therefore may not be legally responsible for any harm caused by their use or misuse.

The relative numbers of these five classes of drug distributors doubtless vary considerably in different countries, and probably cannot be ascertained for any one country. In Great Britain, for instance, there are some thirteen thousand registered "Chemists and Druggists," but how many of these are in business on their own account, and how many are assistants who have passed the qualifying examination, we do not know; nor do we know how many of those in business on their own account are mere vendors of drugs, and how many can give, respecting all their drugs, the personal guarantee of purity and efficiency already alluded to. There are twenty-three thousand registered practitioners of medicine in Great Britain and Ireland, but how many of them are direct distributors of medicines we do not know. What amounts of drugs are annually sold by grocers, drapers, and other non-pharmaceutical vendors we do not know. Patent medicine stamp duty to the amount of nearly £140,000 was paid into our Inland Revenue in the year ending March 31, 1881, which is equivalent to at least one million of pounds as the present annual payment by the public for secret remedies. But many proprietary medicines are not liable to stamp duty; so that the extent to which drugs are distributed in this way we do not quite know, though it is obviously very considerable.

Thus far the position of pharmacy in relation to the State has been defined, and an outline given of the means or method or machinery—partly haphazard, partly almost naturally evolved—by which pharmacy performs her State functions of collecting, elaborating, and distributing drugs.

Does this existing condition of pharmacy admit of improvement? If so, in what directions?

These are questions of great importance to the community. They are also of the highest importance for the pharmacist, both from the point of view of bounden duty to the State, and from that of obvious self-interest.

That the pharmacy of the present day admits of improvement will probably be admitted by the pharmacists of every State. What human institution does not? But respecting the directions in which improvements may be effected, the period at which they may be introduced, and the rate at which they may be carried out, there will be differences of opinion, especially as regards different States. The pharmacists of each separate nation must therefore separately discuss this question, at all events, as a preliminary step to international discussion at any future time. Our own discussion of the relation of pharmacy to the State will at present be carried on solely from the British standpoint.

Collection; Elaboration; Distribution.—Let us again in this order consider the general direction of possible improvements in our important and honourable State relations: our relations on the one hand to remedial agents, and on the other to our fellow-countrymen, who all, at one time or other, need remedial agents.

Collection, including, as already indicated, commercial investigations and original research.—The therapeutical importance of quinine and morphia have secured attention to the cultivation of the cinchona tree and the opium poppy; but for the vast majority of vegetable drugs, we still have to rely, as regards quality, on the somewhat capricious kindness of unaided nature, and as regards quantity and quality, too often on the good and bad consciences, and perhaps commercial cupidities, of more or less ignorant and irresponsible collectors. Why should not drug farms be more generally established, even in Great Britain? Is land required? Many food farms are being thrown out of cultivation in this country. Would farming other than food farming be likely to be remunerative? Flower farming and fruit farming are among the most lucrative callings in these islands. Could not some pharmaceutical body emulate the Royal Agricultural Society with its Woburn experimental farm? May we not hope that a Lawes will arise in pharmacy, who, founding a Rothamstead, will pioneer us towards the successful scientific cultivation of most of the medicinal plants? The area of pharmaceutical research, in the largest sense of that term, including improved modes of collecting as well as of investigating drugs, could be extended by the State, by societies, and by individuals. But State aid to research of any kind is almost necessarily accompanied by State control, and some peoples are impatient of control, and do their duties to their calling and to the public with the maximum of efficiency in an atmosphere of freedom. State aid in carrying on research in pharmacy would probably be less effective than internal effort, hence improvement in pharmaceutical research by such aid is scarcely to be expected. Internal effort to improve and extend pharmaceutical research may come from societies and from individuals. And already in Great Britain the Pharmaceutical Society and the Phar-

maceutical Conference have given good aid to research, especially in affording opportunities for individuals in pharmacy to bring their researches before their fellow pharmacists, to publish researches without expense, and in the case of the Conference to carry on researches at diminished expense. But any really comprehensive scheme of aid to research by societies, as societies, needs far more ample funds than those at the disposal of the bodies just named; and the source of such funds is not obvious so long as two-thirds of the pharmacists of the country stand aloof from the other third in all matters pertaining to the general pharmaceutical welfare, withholding even that small annual subscription which, contributed by the many, would allow of so much good in many directions being accomplished. In the matter of pharmaceutical research by individuals, English pharmacists, even with the limited aid of the Pharmaceutical Society or the Pharmaceutical Conference, are holding their own, let us hope, but not much more. Such men as a Deane, a Morson, or a Squire need no incentive. Force of character and love of truth for its own sake have always and will always bring a few such men to the front, but we can never hope to see many there. The educational endeavours at the headquarters of the Pharmaceutical Society during the past forty years have always included efforts in the direction of the encouragement of research, and associations of students and assistants for the prosecution of investigations, more or less original, have been the immediate outcome, a subsequent result being the enleavening spread of active workers at original research, and men having sympathy with original research, throughout the whole country. The introduction of compulsory examination into British pharmacy in 1868 was expected to result, *inter alia*, in such an impetus to education as would carry large numbers of young pharmacists into the region of original investigation. That such an impulse has not resulted, that the cause of the failure has been detected, and that a remedy has been found and is to be applied forthwith, are now matters of history. Soon again will every young pharmacist in this country have such opportunities for acquiring sound pharmaceutical education as will start him fairly on the road to research; and we may reasonably expect that a certain proportion will continue to travel along that grand highway. Sooner or later, therefore Great Britain, let us hope, will be not only abreast, but ahead, of other countries in the matter of pharmaceutical discovery; that is to say, in the matter of a more extended and trustworthy *materia medica*.

In the matter of the improved collection of drugs, therefore, including the development of the maximum activity of medicinal plants and general control over their growth, and including the prosecution of those branches of original research which shall extend the number and the definiteness of drugs, there is room for great improvement in English pharmacy.

Elaboration.—Is a State best served, as regards pharmacy, by a large number of distributors of elaborated drugs, only a few persons being manufacturers of the preparations, or by, probably, a smaller number of distributors, each however making his own preparations? "A smaller number," because, in any calling, the greater the skill, knowledge, and intelligence of its followers, the greater their reasonable expectations of remuneration, and therefore the fewer that can be supported by the community. Now, in Great Britain, unquestionably, the tendency—at all events during the past fifty years—has been for fewer and fewer of the distributors of drugs to manufacture their own medicinal preparations, the retailer relying for these more and more on wholesale manufacturers. Is this practice likely to promote the interests either of the public or of the pharmacist himself? In dealing with a druggist for drugs, simple or compound, the public expect to be served with what is trustworthy. The vendor is a "chemist" as well as a druggist; therefore, presumably, he can chemically verify the trustworthiness of those of his drugs which have chemically definite characters. But he is a "druggist" as well as a chemist; therefore, presumably, he can guarantee the trustworthiness of his non-chemical drugs and drug-compounds. How can he do this if he has not himself prepared those compounds? For they cannot be assayed chemically. Nay, if he has not himself made them from the raw drugs, and thus by long acquaintance with the latter become thoroughly familiar with them, and a thorough judge of their character, how can he guarantee the quality even of what few drugs he may sell in the raw state? Further, if a druggist has not made his own preparations, and has not tested those he purchases—either because he himself cannot test them, or because they are beyond the grasp of chemical analysis,—is he one whit the superior in pharmacy to his neighbour, the medical practitioner? Possibly both purchase their compounds of the same wholesale dealer. And if such a *soi-disant* druggist is not more of a druggist than the medical practitioner, where is the foundation for the hope that the medical practitioner will some day turn over all his medicine-making to the pharmacist?

Again, if the druggist is only a distributor and not a compounder or elaborator or manufacturer of drugs, has he much more claim to be even a distributor than a grocer or any other trader who buys or distributes drugs? Is the State much better served by one of these distributors than by the other? Let there be no misunderstanding here. The cry of "drugs for the druggist" is a good and wise cry, but only when founded on the druggist's knowledge of drugs, and on his personal guarantee of their efficiency,—a guarantee founded, as before stated, on his having either made or tested all, or practically all, of his preparations. If he merely buys and sells his preparations, without such personal knowledge, he cuts his own professional platform from beneath his feet. Having taken up the ground of a mere trader, can he wonder if other more astute traders beat him on that ground. Neglecting what ought to be his own cherished art of elaborating or compounding his preparations, can he wonder if he has to relinquish that remuneration, those profits, which were born of the times when the druggist was such a manufacturer,—profits which are still enjoyed by those who do so manufacture. Relinquish them he must if he deliberately labours on the lines of mere trade. In these days of over-population and, consequently, keen competition, no other result can ensue. It is a case of reaping what is sown. And the sooner such a man realizes his position and adds to his trade the trades of those who otherwise will supplant him, the sooner will he be saved from ruin. This differentiation between trading retail druggists and manufacturing retail druggists is already going on. Afterwards there will be another. Some day what remains of the trading retail druggist's trade in drugs will flow away from him to the counter of the manufacturing retail druggist, even though the latter be charging higher prices; for in proportion as purchasers find they cannot judge for themselves, they will go to those who can judge for them. Then if the trader has cultivated other trades, he will have them to fall back upon. Fortunately, in the long run the fittest must survive: the fittest tradesman who is only a tradesman, and the fittest pharmacist who is a tradesman and a professional man too. Does the pharmaceutical apprentice of to-day desire future pharmaceutical success? Let him master the principles of his art. Let him practically learn how, by the aid of chemistry and botany, to test the quality of most of the articles he works with, and how to manufacture what cannot be tested.

Broadly, as a matter of self-interest and sound policy, the preparation of medicinal compounds by a few druggists only, and their mere distribution by the many, is a practice to be deprecated. Clearly, too, it is to the interest of the public that every druggist should be really, as well as nominally, a druggist,—a man who either tests or manufactures every one of his own preparations. All efforts to secure future drug dealing and drug-working

to druggists must be founded on personal professional knowledge possessed by every pharmacist. A medical practitioner purchasing drugs at all will surely prefer to obtain them from the neighbouring druggist rather than from a distant source, if he knows that the druggist can give the guarantee of genuineness that he himself cannot provide, and if they can be obtained at a reasonable price. May he not in many cases go further, and give up dispensing bodily, if in the matter of trustworthiness of materials the druggist can beat him, and if, of course, neither he nor his patient suffer too severely in pocket? For the practitioner will thus get that personal guarantee which should be the druggist's most treasured possession, a guarantee which must, in the nature of things, be stronger when afforded by a neighbour than when offered by the distant dealer, especially when in the latter case it is only afforded at second hand by a price list or a traveller. Contrast the value of the guarantee of a retailer who is also a maker, with 'that of a druggist who can only trust to the respectability of a maker separated from him by two or three different agents and by scores or hundreds, if not thousands, of miles. Some preparations will doubtless always be better made by one man than by another, or by few persons rather than by many. Let us do nothing to damp the ardour of discoverers, inventors, or originators, in great things or in small. And let us always welcome to our shores anything of excellence that may be offered to us by other countries. But if pharmacy has anything to do with the health and welfare of a State, and if that health and welfare are affected by the personal skill, knowledge, and ability of the pharmacist, let us avoid those false but specious principles, and those false and more specious practices, which would sink pharmacists to the level of mere traders, mere dealers, mere agents, worthy and honourable enough in their sphere though such men might be.

In the matter, then, of the elaboration of drugs by all druggists, as against elaboration by a few druggists and distribution by the many, there is room for great improvement in English pharmacy; for it would be idle to deny that the preparation of his own compounds is the exception rather than the rule with the British pharmacist. No doubt druggists who are manufacturers as well as retailers of the preparations on their shelves may readily enough be found; but it is a fact that many druggists scarcely make even their own pills, but purchase them of wholesale makers (or even only of dealers) who reside, it may be, in quite another county, possibly in another country or in another continent altogether. What can such a druggist know of the quality of such articles? He urges the respectability of their maker. But how much can he know of the characters of makers separated from him by an ocean? After a time prominent makers may be severely pressed by more obscure manufacturers, and he may be dealing with some of the latter, whose probity, with a sense of responsibility naturally diminished by distance, may have given way. In purchasing preparations cheaper, as such a druggist thinks, than he can make them himself, and, still sadder to say, perhaps better looking, is he not buying pottage with the coinage of birthrights? Is he not dealing disastrously with his own interests, and with those of the State, in which he is after all but a steward?

Into the question of improvements in the elaboration of particular drugs it is not desirable now to enter; first, because it is dealt with in the list of subjects for research annually issued by the British Pharmaceutical Conference; secondly, because the spirit of emulation will not permit it to pass out of sight; and, thirdly, because it would be unwise to dwarf the importance of the main question just considered.

Distribution.—Given a body of pharmacists, each member of which can, respecting his drugs and drug compounds, supply either the analytical or the synthetical guarantee of efficiency and trustworthiness, then a State is best served by drug distribution being limited, on the whole, to such a body. Limited as a rule. For just as some drug compounds will probably always best be prepared by the few and distributed by the many, so the distribution of drugs to dwellings remote from towns will probably always have to be accomplished by mere distributors. The main limitation of drug supply to the public should, however, be to qualified druggists—men who prepare as well as distribute. The public in a sparsely populated district might purchase drugs of a mere distributor rather than do without them, especially if the real manufacturer were not far off, and whose personal guarantee were available at the cost of a long walk or a drive, or a short railway journey—just as the services of a solicitor's confidential clerk, or of a medical practitioner's assistant, will be accepted in the absence of those of the principal. Bearing in mind, however, the importance in pharmacy of the influence of the personal guarantee, and that this influence becomes weaker and weaker the more it is stretched, the distribution of drugs should, obviously, in the interests of the public and of pharmacy itself be confined, as a rule, to those who can afford such a personal guarantee—to those who, let me reiterate, either compound or test every drug they distribute. In the matter of pharmacy a State will, year by year, be better and better served to the extent to which there obtains a pharmaceutical policy that provides for the growth, not of those already named as mere distributors of drugs, but of druggists who are manufacturers and distributors too.

The third-named agent of drug distribution, the medical practitioner, cannot be, and probably never desires to be, a competent pharmacist. He has never professed to be anything more than a distributor of drugs, and as year by year the demands upon his medical, surgical and sanitary skill become, as they do, greater and greater, he will probably find his pecuniary interests, his tastes, and his aspirations for social position, prompting him to relinquish drug distribution altogether. Let pharmacists take care previously to prepare themselves for the work that will then fall into their hands; for whatever be the period when such a state of things comes to pass, it will be the outcome of a public demand for more and better work all round, from the pharmaceutical as well as from the medical practitioner; nay, the period of the demand will be greatly accelerated by the promise and power of the potential supply. Doubtless the country doctor will always carry, or hold himself ready to carry, in his pocket, his saddle-bag, or his carriage, agents which heal as well as agents which hurt, agents to inject into the flesh as well as those with which it may be incised, agents in the form of the soothing pill or the stimulating spirit. But for the compounding of even these he will look to the pharmacist proper, who with due and dignified responsibility will be near at hand to supply fresh and trustworthy fluids, convenient combinations, and palatable preparations, and who will receive adequate but not extravagant remuneration.

Respecting the distribution of drugs by retail vendors other than competent and trustworthy druggists, it is open to very serious question whether a State does not get more harm than good by such a practice. Such vendors can offer no personal guarantee either of the purity or the efficiency of their drugs. The practice may perhaps be tolerated for a time in a country where the machinery for the supply of druggists who are compounders as well as distributors is incomplete. But in a State in which all the druggists are competent for their work, the supply of medicinal agents by vendors other than druggists should only be permitted in districts where population is below a given number per square mile, and then only in unbroken packets supplied by a not far distant registered and responsible pharmacist. With non-pharmaceutical vendors of drugs must be classed co-operative stores. For personal responsibility respecting either raw or compounded drugs is scarcely compatible with the co-operative system. The companies who own co-operative stores

do not make their own drug compounds. They are mere distributors. They could not well do or be anything else. At first sight it would appear that such an undesirable condition of things for the welfare of the public might be remedied by the employment at such stores of a staff of properly qualified pharmacists; men who could not only discriminate between good and bad raw drugs, but who could and would test all supplied drugs admitting of assay, and who could guarantee the quality of all other preparations because they had made them. There is, however, a good reason why such a remedy could not work, for then the cost of, and hence the prices charged for, dispensing prescriptions would necessarily be pretty much those of ordinary retail shops, and the inducement for the public to deal at stores rather than at shops would cease. Besides, long before such a remedy can be applied, society will probably find that money saved at co-operative stores, having to be expended in those rates and taxes, and in those many services now paid for by shopkeepers, there will be a balance of State advantages in leaving trade to the trader, and certainly in leaving the half-trade, half-profession of pharmacy to the pharmacist.

Respecting the distribution of drugs in the form of proprietary preparations, especially those called patent medicines. The question here must be not so much what improvements can be effected in this mode of distributing drugs to the inhabitants of a country, as, can the inexorable demand for simple medicinal remedies by the public be supplied in any better form than that of patent medicines. For the demand for simple remedies by all persons, and the habit of prescribing simple remedies by all persons for themselves, or for one another, are matters which always have lain outside, and always will lie outside, medical practice by professional men, a demand and a habit the source of which lies deep down among the springs of human nature, and of the common sense of free people. They therefore scarcely admit of criticism, and do not admit of carping, cavilling objection. The demand and the habit exist naturally in this country, and must be dealt with wisely. They scarcely admit even of definition, or of the drawing of any line up to which they may go, and beyond which they may not go. This much would seem certain, however, that if a mother for a child or a friend for a friend may prescribe a remedy which has proved serviceable under similar circumstances, surely a druggist, who is daily dealing with remedies from year's end to year's end, may prescribe simple remedies too. If one druggist will not do so, we may be quite sure another will; and that to the extent to which druggists generally do not or cannot prescribe simple remedies, to that extent patent medicine owners will step in and supply the irrepressible demand. Some medical men decry the habit of prescribing by druggists; but is the demand for simple remedies by channels other than the medical man's prescription thereby curtailed? Probably not. On the other hand, do not such medical men, and those druggists who from various motives follow the medical lead, thereby play directly into the hands of the proprietors of patent medicines? In the United States the practice of medicine is largely separated, and most wisely separated, from the practice of pharmacy. But besides this, the open recommendation of simple remedies by druggists is discouraged. With what result? In no country is traffic in secret remedies more rife. It is of course wrong for the pharmacist to meddle with pathology, attempting to diagnose while knowing nothing about the human frame. I trust no one will construe what I have said into support of quackery. But whenever and wherever a druggist is free to sell a patent medicine, he surely should be free to sell and be able to sell a simple remedy prepared by himself, by the aid of that special pharmaceutical knowledge and skill which are the guarantee that he is something more than a mere drug distributor. The inability to recommend remedies characteristic of the mere seller of drugs, and the professional jealousy which would stop a qualified pharmacist from recommending them, have probably done more to foster the present enormous demand for secret remedies than all other causes put together. The reduction of what is sometimes termed the patent medicine evil will probably be effected, chiefly, by that gradual extension of pharmaceutical knowledge amongst our future pharmacists, which will enable them to supply from their own shelves simple remedies for those tiresome minor maladies for which the public are now driven to patent medicines. The druggist who in this country prescribes simple remedies is a man who has been called into existence by the wants of the community; a useful servant, whom the public are too mindful of their interests ever to discharge. Society distinguishes clearly enough for all practical purposes between this man and the medical practitioner, and well may be left to seek the aid of one or other as required.

For improvement in drug distribution, therefore, we may reasonably look in two directions. First, in the distribution of drugs being limited, in the main, sooner or later, and of course without injuring any one, to druggists, such druggists being compounders as well as distributors of the drugs with which they deal. This will be brought about internally by education, externally by legislation. Internally by the carrying out of that policy to which pharmacists may now be said to be committed, and which may be summed up in the words sound and thorough compulsory pharmaceutical education; externally by appropriate legislative enactments. Improvement will result, secondly, in our having in the place of secret remedies, which are prescribed by persons at a distance, who are irresponsible, the open recommendation of simple remedies by pharmacists who have made the components themselves, and who can guarantee their trustworthiness. This too will be brought about gradually by improved pharmaceutical education, and by that only. It would be unwise to provide for pharmacists any modified medical education. Let there be no pretence of professional medical treatment mixed up with pharmacy. Let the druggist's recommendation of simple remedies be founded on that knowledge and experience which comes of much pharmaceutical familiarity with remedies, and on that common sense and perception in all that pertains to drugs, with which a properly and specially educated pharmacist may be credited. Indeed, any trespassing on the purely medical domain would necessarily sooner or later involve commensurate punishment.

Pharmaceutical Legislation. The old partnership of *Chemists and Druggists. Pharmaceutical Organization.*—A few words must be added on each of these subjects.

Legislation.—As regards legislative enactments that will enable pharmacy better to perform her duties to the State, they must always be of two kinds—each complementary to the other. First, those designed for the well-being of the public; second those which provide for the well-being of the pharmacist. It is to the interest both of the public and the druggist that the sale of poisons should be restricted, it is to the interest of both that the sale of compounded drugs should be restricted. For a State to assert that druggists must be qualified is only, in other words, to proclaim that drugs should not be sold by unqualified persons: the one proposition is involved in the other. It is law that the British druggist must be qualified. The health and welfare of the community has called this law into existence. Why? Because the health and welfare of the community are endangered if this dealer in drugs is not qualified. To this end the law has labelled him alone "chemist and druggist." From this point of view a Pharmacy Act which provides for the qualification of drug vendors without rendering penal the vending of drugs by unqualified persons is simply incomplete. It is no answer to this argument to say that the State, by protecting the title "chemist and druggist," has only adopted means for the proper supply of drugs to those of the public who cannot judge for themselves, and who desire State guidance, and that to go farther than this would be to interfere with freedom. *Caveat emptor* does

not apply here, however good the judgment for other things may be. For no ordinary purchaser is able to judge of drugs. It is too bad to expect him even to judge of the qualifications of the vendor solely by the presence or absence of the words "chemist and druggist" in connection with the shop, for the time-honoured coloured show-bottle and a display of senna, rhubarb, etc., forms the commoner test. To provide for the well-being of the public who cannot judge of drugs for themselves something more than the test of title should be allowed. But in truth no such indirect mode of providing the public with qualified druggists will suffice for the public welfare. The only way in which the welfare of the public, so far as it is affected by drugs, can be provided for, and harm to the public, as far as it may come from drugs, be provided against, is not only to enact that druggists must be qualified, but that drugs must not be sold by unqualified persons. This is already enacted for a certain small number of drugs named in a schedule to the Pharmacy Act of 1868, and deemed poisons. So far so good. But all drugs are, more or less, poisons. The sale of all drugs should be thus restricted. If there are any substances sometimes used as drugs, but so harmless, and so generally used for other purposes, that to restrict their sale would be inconvenient to the public, let such drugs alone be scheduled as those which may be sold by unqualified persons. A Pharmacy Act which provides for the qualification of vendors of drugs, but contains no clause preventing the sale of drugs by unqualified persons, is incomplete. And if our own Pharmacy Acts are thus incomplete, the sooner they are rendered complete by an extended Pharmacy Act, the better for the State, the pharmacist, and the public. To get our legislature to take an interest in this matter, and to view it in its proper bearings, should be the only difficulty in the way of obtaining legislative enactments which will better enable British pharmacy to perform her duties to the State. This is no mere matter of class legislation, but a subject of considerable national importance. Let us only take care that the thoroughness of our pharmaceutical education fully demands or warrants such legislation, which it will do when founded not alone on that very inefficient test termed "a pass examination," but also on a properly arranged public curriculum diligently followed for an appropriate period.

Chemists and Druggists.—An address on the relation of pharmacy to the State should include, at all events in Great Britain, some allusion to that part of the implied duty of a pharmacist to his country covered by his use of the designation or title of "chemist." The English pharmacist is a "chemist and druggist." From what has already been stated, it will be clear that the proper standard as regards such a "chemist," is that of a man who is not only a vendor of chemical substances, but who has sufficient professional knowledge of chemistry to enable him to guarantee analytically every one of his drugs and chemical substances that admits of chemical assay. And there are large numbers of pharmacists in this country who can do all this and more. But does the average chemist and druggist of to-day come up to this standard? Is he even a general trading *chemist?* Is he not rather a man who has left to the oilman and the grocer the vending of "soda" and other alkalies, vinegar and other acids, delicate mineral and vegetable dyes and colouring matters, and hosts of such "chemicals," as they are termed; a man who, while calling himself and legally appropriating to himself the title of "chemist," has through his ignorance of chemical substances, allowed chemists, who dare not call themselves chemists, to establish shops for the sale of photographic and other chemicals, and chemical and physical apparatus generally; a man who, through being unable to perform such simple chemical operations as the testing of a fluid excretion for albumen or sugar, has driven from his doors the physic-taking patient afflicted with diseases of the albumenoid or saccharoid type; and a man who has committed these sins of omission, not always because his time was wholly occupied with the pursuit of pure pharmacy. Can such "chemists and druggists" wonder that their calling is declining in this country, when even for chemical guarantees of the genuineness of their goods they must rely on the distant wholesale manufacturer, and for the pharmaceutical attractiveness of prettily coated pills, they find it necessary to go to the other side of the Atlantic? Will the rising generation of pharmacists allow this state of things to continue? No doubt a great deal of the work of the pharmacist of fifty or one hundred years ago has gone never to return, but a vast amount of new work has taken the place of the old. Chemistry is progressing with a rapidity unexampled in the annals of man's avocations. The trade in the materials and apparatus for the study and the practice of chemistry by amateurs, professional men, and manufacturers, is extending year by year. Will trading "chemists" allow this chemist's trade to slip through their hands? At no previous period in the history of this country has the subject of purity of food, drink, drugs, and all other things, occupied so much attention as at present. Never was there a greater demand on the part of the public, not for direct analysis at the request of ordinary purchasers by officials under the Acts relating to adulteration—that Parliamentary scheme (Act of 1875, section 12) has entirely failed—but for the personal guarantees of vendors that articles sold are what they are professed to be. Who so well able to give this guarantee as the "chemist and druggist" who is a chemist as well as a druggist. Such a chemist will extend his trade over the whole commercial area of chemistry, as well as draw to himself those pharmaceutical streams now flowing in channels uncontrolled by pharmacists. There is also minor professional work to be done by the "chemist" in such directions as those already indicated; work chiefly qualitative, and for which the chemist and druggist would perhaps only receive silver fees, but for which he would be remunerated over and over again in the confidence reposed in him by his customers, and by the medical practitioners of the neighbourhood, and in the prestige and status it would win for him.

Organization.—A word respecting organization amongst pharmacists. Organization, in the absence of which any consideration of improvements in the modes of collecting, elaborating, or distributing drugs would be little more than a dream. Organization, without which the duties of chemists and druggists to the State will only be performed in an incomplete and haphazard manner, and without which their own interests will be developed or maintained very imperfectly if at all. Such organization—the work of a generation of philo-pharmaceutic pioneers—exists already in this country as regards about one-third of the chemists and druggists. Had the other two-thirds responded to the general appeals made by their brethren more than once during the past forty odd years, it is safe to aver that not only would the State at this moment be better served by pharmacy, but every pharmacist would be richer in pocket, richer in social position, richer in self-respect. Even now, were the advantages of union and a pathway to union brought home to every pharmacist—which could be well done now that we have a complete Register—there can be little doubt that nearly every druggist having any really important stake in pharmacy would join in forming a Pharmaceutical Society of Great Britain co-extensive with British pharmacy. It would be astonishing, indeed, if after such a special appeal any very large proportion of the druggists in the country were found to care so little for the welfare either of themselves or of the community, or to perceive that welfare so imperfectly, as to hold aloof from such an organization. But our chief hope must rest with our pupils and young men. Cannot some plan be carried out by which all future pharmacists shall become members of one great national society?

Conclusion.—In the course of this address on an aspect of pharmacy complementary to the political, an attempt

has been made to set forth the duties of pharmacy to the State in obtaining, elaborating, and distributing drugs; suggestions have been offered by which pharmacy may better perform these duties; hopes thrown out respecting the duty of the State to pharmacy, though this, being a political question, has only been glanced at; and for the thoroughly qualified chemists and druggists of Great Britain generally, a brighter future foreshadowed than might at first sight be anticipated. Amongst the body there are large numbers who can well hold their own with the pharmacists of any country in the world, whether as followers of pure pharmacy or as "chemists" as well as "druggists." All that these are now, the rising generation of pharmacists should strive to become. With a thoroughly united, thoroughly educated, body of pharmacists, in number properly proportionate to the population of the country, each pharmacist a unit in one great society of pharmacists, we may confidently predict for no very distant future a relationship between pharmacy and the State which shall be permanently beneficial to all concerned. We too

" . . . rest in faith
That man's perfection is the crowning flower,
Toward which the urgent sap in life's great tree
Is pressing,—seen in puny blossoms now,
But in the world's great morrows to expand
With broadest petal and with deepest glow."

Mr. Chipperfield said the gentlemen present had all listened with much attention and gratification to the eloquent address just given; an address eminently practical and full of interest both to pharmacists and the general public; and he would fain hope that at least some benefit to the general public might be the outcome of its publication. It had always seemed to him an anomaly and a glaring injustice that while the pharmacist of the present day was bound to acquire an excellent education and to submit himself to a stringent examination he had no legal safeguard and possessed no special privileges in carrying on his vocation. The mere scheduling of a certain number of poisons, and he alone having the right to vend them, was virtually no protection or benefit to him or to the public, and nothing more incontrovertible was ever uttered than the proposition that a Pharmacy Act which provided for the qualification of the legal vendors of drugs, but contained no clause preventing their sale by unqualified persons, was incomplete, it being lame and impotent in the extreme. The great difficulty to his mind hitherto had been to see how persons living in rural and sparsely populated places were to obtain the necessary medicines if only legally qualified pharmacists might vend them; but the suggestion make by the President that unqualified persons should be permitted to supply the consumer with such medicines only in sealed packets supplied by qualified pharmacists completely destroyed that difficulty. It was his pleasure and privilege to propose that a hearty vote of thanks be recorded to the President for his very admirable, eloquent and practical address.

Mr. O. R. Dawson had much pleasure in seconding the vote of thanks. He was quite sure the words uttered that morning would be read by all English-speaking pharmacists with a great deal of pleasure; he hoped that what the President had foreshadowed with regard to legislation would be embodied in the Pharmacy Bill which he hoped it would soon be the duty of the Council to introduce.

Dr. Quinlan wished to say a few words in support of the motion. The address presented a great number of subjects which gave rise to a great deal of reflection, both on the part of the medical profession and also of the pharmacist, for he considered that the interests of these two great callings were inseparable. He had been much struck with the remarks about the collection of drugs, for nothing could be more unsatisfactory in many ways than the manner in which this was now conducted. In fact, it resembled the vicious system of merely asking a candidate what he knew, without any reference to where he had been educated. At present they had to take drugs collected by anybody, and depend on the commercial conscience for their purity, and, with all due respect for that commercial conscience, he might say that anyone who had occasion, as he had, to go through large samples and quantities of drugs, would be convinced of its extreme elasticity. He thought the suggestion made as to the establishment of pharmaceutical gardens was a very good one; they would require a good deal of trouble and skill to be brought to bear, but they would certainly pay. With regard to the practicability there could be no doubt; in the botanic gardens a great number of plants were grown on a small scale, and if a small bed of plants could be grown for the instruction of students, why should not two or three acres be cultivated? The greater certainly included the less. The distribution of drugs was a great difficulty. He had been convinced by long experience that there must be a hard and fast line of separation between the prescribing and compounding of drugs; he believed the two duties must be performed by two entirely distinct classes of persons. There was only one exception to that, and that was in thinly populated districts which would not support a pharmaceutical chemist; there the travelling physician or surgeon, who went thirty, forty, or sixty miles a day, would have to carry about his own drugs, but there was nothing to prevent his getting them from a practical pharmaceutical chemist, who would be able to guarantee their purity either by manufacturing or testing them himself. With regard to the manufacture, there was no doubt that there were some substances which could not be made with economy, except on a large scale; but there was a day within the memory of living men, when the bulk of pharmacists made their own preparations. Those happy days when concentrated infusions and such like things were entirely unknown had gone, and he much wished they would return, and that pharmacists would make their own preparations with the exception of elaborate chemical compounds. He had listened with the deepest regret to the statement that nearly a million a year was spent on patent medicines. People were very fond of dosing themselves, and they would ask for these things, but, in his opinion, a great deal of the blame lay with doctors and chemists, who should endeavour to diffuse truer notions amongst the masses, for it could not be very difficult to persuade them that one article could not cure thirty or forty different complaints; and gradually he hoped they might be able to educate patent medicines off the face of the earth. In conclusion, he alluded to the fact that the Royal University in Ireland required from all candidates for a medical or surgical degree a course of practical compounding and of pharmacy, and it required that this should take place in some regular pharmacy, not in a hospital or dispensary. He thought it extremely important that members of the Irish Pharmaceutical Society should see that they were not left out in the cold with regard to granting these certificates, which he considered they were as much entitled to do as the Irish apothecary. He believed the privilege could be obtained by simply asking for it.

Mr. Hampson wished to thank the President for his very able address, but he feared the hope he had thrown out of getting so much State aid was rather illusory; at all events they might hope, however, to have at some future day the dispensing of medicine protected by the State, and that would be a great step in advance. He must say he had more faith in the good results of educating the people themselves that in anything which was done by the State. When the public became more enlightened on these matters it would go to the best men it could find in the trade or profession, and until that came about he feared there would not be any great change. In London he feared that instead of making any advance in the way of getting the dispensing of prescriptions, they

were rather going backwards; the medical man seemed to look for his profit to the retailing of medicine and giving it in the cheapest possible form.

Mr. ATKINS wished to add his testimony to the value of the address. Professor Attfield had paid a high compliment to the Pharmaceutical Conference in preparing so thoughtful and admirable an address, and the highest compliment those present could pay it in return would be not to attempt to criticize it in detail, but rather to peruse it carefully, and form their conclusions upon it. It had been his privilege to listen to many presidential addresses, but he did not know that he had listened to one which appeared so suggestive and likely to evoke a very large amount of controversy. The very highest tribute which could be paid to it was that it would bring out the points of difference in the pharmaceutical world. The division of the subject was admirable—collection, preparation and distribution were three points which could be at once fixed in the mind. He thought the suggestion of drug farms in this country a very happy one; it might be merely visionary, but he hoped it would prove to be practical, and that it would become practicable to produce on a large scale anything which the climate would admit. He hardly agreed with Professor Attfield as to the necessity or desirability of every chemist making all his own preparations. He quite agreed with him that the knowledge requisite to do it ought to be there, but it seemed to him the tendency of the age was rather to produce the best article under the most perfect conditions, such as could only be attained in large manufactories where there were the best appliances and the most complete division of labour. Still he thoroughly agreed that the knowledge requisite to produce all these preparations ought to be possessed by pharmacists, and if they did not all possess it now, it should be their earnest aim that their sons and successors should possess it.

Professor TICHBORNE also desired to express the pleasure with which he had listened to the address, and remarked that the subject referred to by Dr. Quinlan had engaged the attention of the Council of the Irish Pharmaceutical Society at its last meeting, and measures were being taken to secure if possible that the education of the pharmacist in Ireland should be available for conferring the qualification in the compounding of drugs required of medical men.

The vote of thanks was then put by Mr. GROVES, and carried unanimously.

The PRESIDENT, in response, thanked the meeting for the resolution. He said he had endeavoured, in the words of his predecessor, to give a good, straight look at things as they were, and he had also endeavoured to give a common-sense view of things as they should be. What he had said he simply put forward as his own opinions, and he had been abundantly compensated for any trouble he had taken in preparing the address by the manner in which it had been received.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The meeting of the above Association commenced on Wednesday, August 23, at Southampton, under the Presidency of C. William Siemens, D.C.L. (Oxon.), LL.D. (Glasc. and Dubl.), Ph.D., F.R.S., F.C.S., Member Inst. C.E., who delivered the following opening address:—

THE PRESIDENT'S ADDRESS.

In venturing to address the British Association from this chair, I feel that I have taken upon myself a task involving very serious responsibility. The Association has for half a century fulfilled the important mission of drawing together, once every year, scientists from all parts of the country for the purpose of discussing questions of mutual interest, and of cultivating those personal relations which aid so powerfully in harmonizing views, and in stimulating concerted action for the advancement of science.

A sad event casts a shadow over our gathering. While still mourning the irreparable loss science has sustained in the person of Charles Darwin, whose bold conceptions, patient labour, and genial mind made him almost a type of unsurpassed excellence, telegraphic news reached Cambridge, just a month ago, to the effect that our Honorary Secretary, Professor F. M. Balfour, had lost his life during an attempted ascent of the Aiguille Blanche de Penteret. Although only thirty years of age, few men have won distinction so rapidly and so deservedly. After attending the lectures of Michael Foster, he completed his studies of biology under Dr. Anton Dohrn at the Zoological Station of Naples in 1875. In 1878 he was elected a Fellow, and in November last a member of Council of the Royal Society, when he was also awarded one of the Royal Medals for his embryological researches. Within a short interval of time Glasgow University conferred on him their honorary degree of LL.D., he was elected President of the Cambridge Philosophical Society, and after having declined very tempting offers from the Universities of Oxford and Edinburgh, he accepted a professorship of Animal Morphology created for him by his own University. Few men could have borne without hurt such a stream of honourable distinctions, but in young Balfour genius and independence of thought were happily blended with industry and personal modesty; these won for him the friendship, esteem, and admiration of all who knew him.

Since the days of the first meeting of this Association in York in 1831, great changes have taken place in the means at our disposal for exchanging views, either personally or through the medium of type. The creation of the railway system has enabled congenial minds to attend frequent meetings of those special societies which have sprung into existence since the foundation of the British Association, amongst which I need only name here the Physical, Geographical, Meteorological, Anthropological, and Linnean, cultivating abstract science, and the Institution of Mechanical Engineers, the Institution of Naval Architects, the Iron and Steel Institute, the Society of Telegraph Engineers and Electricians, the Gas Institute, the Sanitary Institute, and the Society of Chemical Industry, representing applied science. These meet at frequent intervals in London, whilst others, having similar objects in view, hold their meetings at the University towns, and at other centres of intelligence and industry throughout the country, giving evidence of great mental activity, and producing some of those very results which the founders of the British Association wished to see realized. If we consider further the extraordinary development of scientific journalism which has taken place, it cannot surprise us when we meet with expressions of opinion to the effect that the British Association has fulfilled its mission, and should now yield its place to those special societies it has served to call into existence. On the other hand, it may be urged that the brilliant success of last year's Anniversary Meeting, enhanced by the comprehensive address delivered on that occasion by my distinguished predecessor in office, Sir John Lubbock, has proved, at least, that the British Association is not dead in the affections of its members, and it behoves us at this, the first ordinary gathering in the second half century, to consider what are the strong points to rely upon for the continuance of a career of success and usefulness.

If the facilities brought home to our doors of acquiring scientific information have increased, the necessities for scientific inquiry have increased in a greater ratio. The time was when science was cultivated only by the few, who looked upon its application to the arts and manufactures as almost beneath their consideration; this they were content to leave in the hands of others, who, with only commercial aims in view, did not aspire to further the objects of science for its own sake, but thought only

of benefiting by its teachings. Progress could not be rapid under this condition of things, because the man of pure science rarely pursued his inquiry beyond the mere enunciation of a physical or chemical principle, whilst the simple practitioner was at a loss how to harmonize the new knowledge with the stock of information which formed his mental capital in trade.

The advancement of the last fifty years has, I venture to submit, rendered theory and practice so interdependent, that an intimate union between them is a matter of absolute necessity for our future progress. Take, for instance, the art of dyeing, and we find that the discovery of new colouring matters derived from waste products, such as coal-tar, completely changes its practice, and renders an intimate knowledge of the science of chemistry a matter of absolute necessity to the practitioner. In telegraphy and in the new arts of applying electricity to lighting, to the transmission of power, and to metallurgical operations, problems arise at every turn, requiring for their solution not only an intimate acquaintance with, but a positive advance upon, electrical science, as established by purely theoretical research in the laboratory. In general engineering the mere practical art of constructing a machine so designed and proportioned as to produce mechanically the desired effect, would suffice no longer. Our increased knowledge of the nature of the mutual relations between the different forms of energy makes us see clearly what are the theoretical limits of effect; these, although beyond our absolute reach, may be looked upon as the asymptotes to be approached indefinitely by the hyperbolic course of practical progress, of which we should never lose sight. Cases arise, moreover, where the introduction of new materials of construction, or the call for new effects, renders former rules wholly insufficient. In all these cases practical knowledge has to go hand in hand with advanced science in order to accomplish the desired end.

Far be it from me to think lightly of the ardent students of nature, who, in their devotion to research, do not allow their minds to travel into the regions of utilitarianism and of self-interest. These, the high priests of science, command our utmost admiration; but it is not to them that we can look for our current progress in practical science, much less can we look for it to the "rule of thumb" practitioner, who is guided by what comes nearer to instinct than to reason. It is to the man of science, who also gives attention to practical questions, and to the practitioner, who devotes part of his time to the prosecution of strictly scientific investigations, that we owe the rapid progress of the present day, both merging more and more into one class, that of pioneers in the domain of nature. It is such men that Archimedes must have desired when he refused to teach his disciples the art of constructing his powerful ballistic engines, exhorting them to give their attention to the principles involved in their construction, and that Telford, the founder of the Institution of Civil Engineers, must have had in his mind's eye, when he defined civil engineering as "the art of directing the great sources of power in nature."

These considerations may serve to show that although we see the men of both abstract and applied science group themselves in minor bodies for the better prosecution of special objects, the points of contact between the different branches of knowledge are ever multiplying, all tending to form part of a mighty tree—the tree of modern science—under whose ample shadow its cultivators will find it both profitable and pleasant to meet, at least once a year; and considering that this tree is not the growth of one country only, but spreads both its roots and branches far and wide, it appears desirable that at these yearly gatherings other nations should be more fully represented than has hitherto been the case. The subjects discussed at our meetings are without exception of general interest, but many of them bear an international character, such as the systematic collection of magnetic, astronomical, meteorological, and geodetical observations, the formation of a universal code for signalling at sea, and for distinguishing lighthouses, and especially the settlement of scientific nomenclatures and units of measurement, regarding all of which an international accord is a matter of the utmost practical importance.

As regards the measures of length and weight it is to be regretted that this country still stands aloof from the movement initiated in France towards the close of last century; but, considering that in scientific work metrical measure is now almost universally adopted, and that its use has been already legalized in this country, I venture to hope that its universal adoption for commercial purposes will soon follow as a matter of course. The practical advantages of such a measure to the trade of this country would, I am convinced, be very great, for English goods, such as machinery, or metal rolled to current sections, are now almost excluded from the continental market, owing to the unit measure employed in their production. The principal impediment to the adoption of the metre consists in the strange anomaly that although it is legal to use that measure in commerce, and although a copy of the standard metre is kept in the Standards' Department of the Board of Trade, it is impossible to procure legalized rods representing it, and to use a non-legalized copy of a standard in commerce is deemed fraudulent. Would it not be desirable that the British Association should endeavour to bring about the use in this country of the metre and kilogram, and, as a preliminary step, petition the Government to be represented on the International Metrical Commission, whose admirable establishment at Sèvres possesses, independently of its practical work, considerable scientific interest, as a well-found laboratory for developing methods of precise measurement?

Next in importance to accurate measures of length, weight, and time, stand, for the purposes of modern science, those of electricity.

The remarkably clear lines separating conductors from non-conductors of electricity, and magnetic from non-magnetic substances, enable us to measure electrical quantities and effects with almost mathematical precision; and, although the ultimate nature of this, the youngest scientifically investigated form of energy, is yet wrapt in mystery, its laws are the most clearly established, and its measuring instruments (galvanometers, electrometers, and magnetometers) are amongst the most accurate in physical science. Nor could any branch of science or industry be named in which electrical phenomena do not occur, to exercise their direct and important influence.

If then, electricity stands foremost amongst the exact sciences, it follows that its unit measures should be determined with the utmost accuracy. Yet, twenty years ago, very little advance had been made towards the adoption of a rational system. Ohm had, it is true, given us the fixed relations existing between electromotive force, resistance and quantity of current; Joule had established the dynamical equivalent of heat and electricity, and Gauss and Weber had proposed their elaborate system of absolute magnetic measurement. But these invaluable researches appeared only as isolated efforts, when, in 1862, the Electric Unit Committee was appointed by the British Association, at the instance of Sir William Thomson, and it is to the long-continued activity of this Committee that the world is indebted for a consistent and practical system of measurement, which, after being modified in details, received universal sanction last year by the International Electrical Congress assembled at Paris.

At this Congress, which was attended officially by the leading physicists of all civilized countries, the attempt was successfully made to bring about a union between the statical system of measurement that had been followed in Germany and some other countries, and the magnetic or dynamical system developed by the British Association, also between the geometrical measure of resistance, the (Werner) Siemens unit, that had been generally adopted abroad, and the British Association

unit intended as a multiple of Weber's absolute unit, though not entirely fulfilling that condition. The Congress, while adopting the absolute system of the British Association, referred the final determination of the unit measure of resistance to an International Committee, to be appointed by the representatives of the several Governments; they decided to retain the mercury standard for reproduction and comparison, by which means the advantages of both systems are happily combined, and much valuable labour is utilized; only, instead of expressing electrical quantities directly in absolute measure, the Congress has embodied a consistent system, based on the Ohm, in which the units are of a value convenient for practical measurements. In this, which we must hereafter know as the "practical system," as distinguished from the "absolute system," the units are named after leading physicists, the Ohm, Ampère, Volt, Coulomb, and and Farad.

I would venture to suggest that two further units might, with advantage, be added to the system decided on by the International Congress at Paris. The first of these is the unit of magnetic quantity or pole. It is of much importance, and few will regard otherwise than with satisfaction the suggestion of Clausius that the unit should be called a "Weber," thus retaining a name most closely connected with electrical measurements, and only omitted by the Congress in order to avoid the risk of confusion in the magnitude of the unit current with which his name had been formerly associated.

The other unit I should suggest adding to the list is that of power. The power conveyed by a current of an Ampère through the difference of potential of a Volt is the unit consistent with the practical system. It might be appropriately called a Watt, in honour of that master mind in mechanical science, James Watt. He it was who first had a clear physical conception of power, and gave a rational method of measuring it. A Watt, then, expresses the rate of an Ampère multiplied by a Volt, whilst a horse-power is 746 Watts, and a Cheval de Vapeur 735.

The system of electro-magnetic units would then be:—

				C.G.S. Units.
(1) Weber,	the unit of	magnetic	quantity	$=10^8$
(2) Ohm	,,	,,	resistance	$=10^9$
(3) Volt	,,	,,	electromotive force	$=10^8$
(4) Ampère	,,	,,	current	$=10^{-1}$
(5) Coulomb	,,	,,	quantity	$=10^{-1}$
(6) Watt	,,	,,	power	$=10^7$
(7) Farad	,,	,,	capacity	$=10^{-9}$

The word energy was first used by Young in a scientific sense, and represents a conception of recent date, being the outcome of the labours of Carnot, Mayer, Joule, Grove, Clausius, Clerk-Maxwell, Thomson, Stokes, Helmholtz, Macquorn-Rankine, and other labourers, who have accomplished for the science regarding the forces in Nature what we owe to Lavoisier, Dalton, Berzelius, Liebig, and others as regards chemistry. In this short word energy we find all the efforts in nature, including electricity, heat, light, chemical action, and dynamics, equally represented, forming, to use Dr. Tyndall's apt expression, so many "modes of motion." It will readily be conceived that when we have established a fixed numerical relation between these different modes of motion, we know beforehand what is the utmost result we can possibly attain in converting one form of energy into another, and to what extent our apparatus for effecting the conversion falls short of realizing it. The difference between ultimate theoretical effect and that actually obtained is commonly called loss, but, considering that energy is indestructible, represents really secondary effect which we obtain without desiring it. Thus friction in the working parts of a machine represents a loss of mechanical effect, but is a gain of heat, and in like manner the loss sustained in transferring electrical energy from one point to another is accounted for by heat generated in the conductor. It sometimes suits our purpose to augment the transformation of electrical into heat energy at certain points of the circuit when the heat rays become visible, and we have the incandescence electric light. In effecting a complete severance of the conductor for a short distance, after the current has been established, a very great local resistance is occasioned, giving rise to the electric arc, the highest development of heat ever attained. Vibration is another form of lost energy in mechanism, but who would call it a loss if it proceeded from the violin of a Joachim or a Norman-Neruda?

(*To be continued.*)

THE "TIMES" ON PROFESSOR ATTFIELD'S ADDRESS TO THE BRITISH PHARMACEUTICAL CONFERENCE.

On Thursday last the *Times* contained in its editorial columns the following remarks on the address by Professor Attfield, printed on another page:—

"The Pharmaceutical Conference is a gathering of men whose doings and discussions should have no little interest for the general community. The dispensing chemist is not exactly a State functionary, but he is an important public servant. In the modern division of professional labour he is the necessary intermediary between the doctor and his patient. The doctor prescribes, the chemist compounds, the patient swallows. Armed with a slip of paper often not too legibly written and never intelligible to non-professional readers, the patient quits the physician's consulting room and goes to the chemist's shop. He is compelled to trust the latter to give him what the doctor has ordered. Doctor and patient, in fact, are entirely in the chemist's hands. The patient does not even know what it is the doctor has ordered, the doctor cannot tell that his orders are carried out. Even if the prescription is duly dispensed according to order, there is still not a little to be taken on trust. The drugs may be old or weak, or they may be of inferior quality. The case supposed, moreover, represents the *minimum* amount of trust ordinarily reposed by the public at large in the dispensing chemist. There must be times and occasions when the dispenser is ignorant, inadvertent, or shifting: when he either makes a sheer mistake, or is tempted to substitute one drug for another with which he happens to be unprovided. There are others when he is induced or even forced by the importunity of his customers to prescribe as well as dispense. There is still, in fact, a good deal of old-world simplicity, not to say superstition, in the popular resort to medical advice. Many good people in country places think nothing of a doctor who does not dose them well, and they discern no material difference in skill between the doctor himself and the chemist who gives them a draught and the old woman who mixes them a dose of simples. Indeed, a very little medical knowledge goes a very long way in country districts, and it is no wonder, therefore, that the chemist is often called upon to do the work of the medical man. All this, however, serves to show the importance to the community of a healthy and elevated tone of the pharmaceutical calling. There is no legal impediment to the sale of drugs, other than certain specified poisons, by anyone. It is true that no one is allowed to call himself a pharmaceutical chemist or to

practise the calling of a chemist and druggist unless he is duly registered under conditions which attest his qualification to dispense medical prescriptions, but this statutory limitation does not prevent the sale of uncompounded drugs by any retail trader, nor does it in any way preclude a dispensing chemist from prescribing on his own account. All that the law requires is that 'persons keeping open shop for the retailing, dispensing, or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge of their business, and to that end . . . . should be duly examined as to their practical knowledge.' These words, which are taken from the preamble to the Pharmacy Act, 1868, represent in summary the exisiting relations of pharmacy to the State. As such they form a convenient starting point for commenting on the address on that subject, delivered at Southampton, on Tuesday, by Professor Attfield, as President of the Pharmaceutical Conference for the present year.

"Professor Attfield considers that legislation in respect of pharmacy is at present in a very unsatisfactory state; but he does not offer any very definite suggestion for its improvement beyond the remark that, instead of scheduling certain drugs as poisons and placing restrictions on their sale, the law should rather schedule only such drugs as may safely be sold by unqualified persons. As, according to the same authority, 'all drugs are more or less poisons,' it is a little difficult to see how such a provision could be made to work in practice. On the whole, we are rather disposed to think, in spite of Professor Attfield, that the law does all that it can or need do at present; the rest may fairly be left to the corporate efforts and feeling of the members of the pharmaceutical calling and to the common sense of the public at large. Very possibly the schedule of poisons given in the Act needs revision and extension; but the Act empowers the Pharmaceutical Society, with the approval of the Privy Council, to enlarge it from time to time. But beyond this, all that the law need require, and probably all that it can practically enforce, is that persons who profess to compound medical prescriptions should be properly qualified to do so, and that their qualification should be publicly registered. No one, of course, would like to think that a prescription sent to the chemist's ran the risk of being made up by a man whose pharmaceutical skill was on a par with that of the chemist's apprentice in 'Pickwick.' The Pharmacy Act precludes such a catastrophe, and for the rest it is safer, perhaps, to trust to such indirect influences as are independent of positive legislation, and more or less outside its sphere. It is highly desirable, of course, that pharmaceutical chemists should be men of high character and good education, and such we understand to be the aim of the Pharmaceutical Conference. But the business of a dispensing chemist is in one sense a trade like any other, and as such it is subject, like any other trade, to the stimulating influence of competition and to the natural conditions of supply and demand. Professor Attfield desired that the chemist and pharmacist should be in reality as well as in name a druggist also—that he should be skilled in the preparation of drugs from the raw material as well as in the compounding of them. This is, no doubt, desirable in itself, but the tendency of modern commerce and industry is to division rather than to concentration, and it is not easy to see how the tendency is to be counteracted. The suggestion that pharmacists should be encouraged to recommend simple remedies compounded by themselves is a good deal more questionable. The practice is common enough, and it could not be easily checked, but certainly it hardly calls for direct encouragement. 'Let there be no pretence of professional medical treatment mixed up with pharmacy,' says Professor Attfield sensibly enough; but it is a little difficult to reconcile this principle with the remark which follows, to the effect that 'the druggist's recommendation of simple remedies should be founded on that knowledge and experience which come of much pharmaceutical familiarity with remedies, and on that common sense and perception in all that pertains to drugs with which a properly and specially educated pharmacist might be credited.'

"The fact is that there is no little variance between theory and practice in this matter. The theory, of course, is that to the doctor only should belong the power of prescribing remedies, and that the pharmacist has nothing to do but compound them. The physician is the man of science; the pharmacist is merely his instrument. Such is, no doubt, the ideal relation between the two, especially as regarded from the physician's point of view. But the popular mind does not always move in this elevated region, and popular practice is still almost as impatient of the solemn '*ordonnances des médecins*' as it was in the time of Molière. In scores of simple cases the chemist's advice is almost as good, or, at any rate, it is thought to be almost as good, as the doctor's; and, what is more to the point, it is a good deal cheaper to obtain. If chemists oftentimes do harm by prescribing, it must nevertheless be remembered that as often as not the real fault lies with the applicant for their advice. A man often goes to the chemist's shop not so much for specific advice as for the purpose of obtaining a remedy that he wants, or thinks he wants. He is hoarse, and thinks a gargle will do him good; he is bilious, and asks for a simple purgative or a saline draught; and the chemist has nothing more to do than to give him a remedy which he has compounded scores of times at the doctor's bidding in similar cases. Where is the line to be drawn? Common sense alone can draw it, and the common sense must quite as often be that of the patient himself as of the chemist to whom he applies. We are afraid that such a lax view as this of the duties and functions of the pharmacist will be regarded as flat heresy by the medical profession. We can only say that medical men are not wholly disinterested in the matter, and we may add that when the patient finds his way to the chemist's shop it is very often the doctor who has first shown it to him. There was a time when the doctor, especially the country doctor, was his own pharmacist. To this day the licence of the Apothecaries' Company is a qualification for the practice of medicine. The practice of medical men compounding their own drugs is by no means extinct, though it is discouraged and discountenanced by the medical profession at large. It has its good and its bad side, no doubt, and very likely the evil preponderates. But if medical men insist on abandoning the practice of pharmacy, it is certain that in many cases the pharmacist will have to supply their place. The practice of consulting pharmacists exists, and, human nature being what it is, we doubt if it is possible to do very much in the way of checking it. Medicine, in one sense, is a science or a whole assemblage of sciences demanding the highest skill and the widest experience for their mastery and practice; in another sense, it is an art of which almost every man considers himself to have at least a smattering. The higher sphere properly belongs to the physicians; if the pharmacists have gained a footing in the lower, it is only because they have thereby satisfied a popular need."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Gerrard, Parker, Hooper, Brown, Dott, Mason, Bush and Co., Hearon and Co., Johnston, Hart, Quinlan, Lamble, Della Rosa, G. A. C., Observer, Nectandra, Wulfruna, Syrupus, Specific Gravity, Associate, North.

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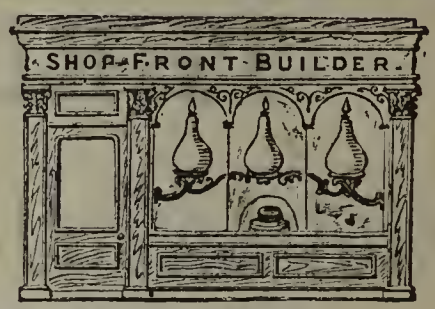

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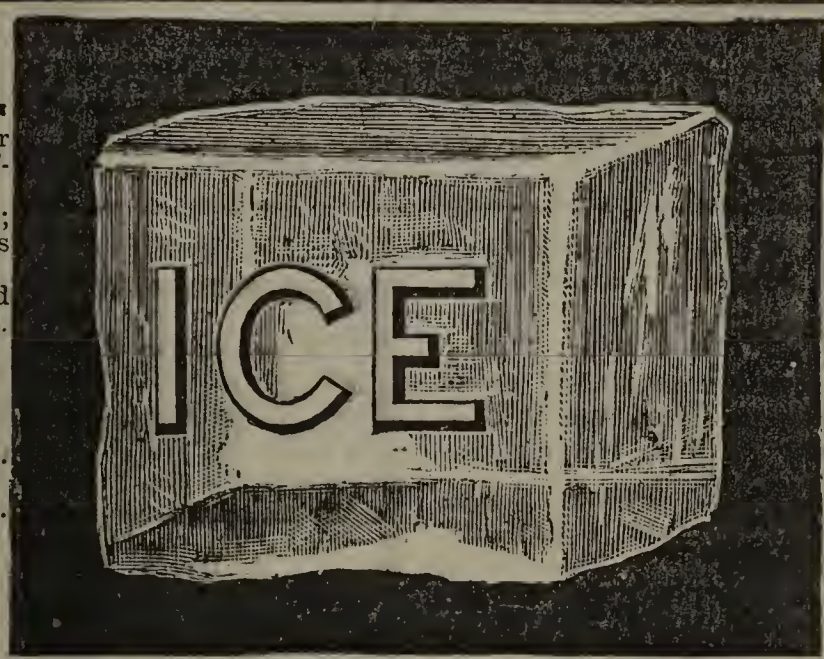

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To counteract cutting houses, and to keep up the Retail Price, the MANNA CAKE is supplied to *one Retail Chemist only* in each town, who has Exclusive Wholesale Profits. *Local Chemists must of necessity order through the Agent.* British Wholesale Drug Houses need not apply. 86,000 have now gone out, and over 230 agents are appointed. Quantities are sent to suit population. To force its sale, arrangements are completed with 570 newspapers, in most of which the above woodcut will appear periodically, and in no case for less than 14 weeks at a time. Extracts from Agents' letters:—"Have sold nearly 8 gross during four months: send another 4 gross."—R. March, Leicester. "My counter sale has reached 10 dozen per week; send another 4 gross." (3rd order).—John Lea, Folkestone. "A favourite medicine here; send another 4 gross."—A. J. Borthwick, Selkirk.

To Colonial and Foreign Houses *monopolies are offered. They are required to guarantee not to supply the home trade through any source.* For Terms send Stamp to Depot, 268, Walton Rd., Liverpool.

KEMMERICH'S EXTRACT OF MEAT, according to analysis, is the best. Prepared at the Compan'ys own Works, Santa Elena, South America. Sole Agents, ROCKWOOD & Co., 12, Long Lane, E.C. Agents required.

KEMMERICH'S EXTRACT OF MEAT.—Dr. ARTHUR HILL HASSALL, M.D.: "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

KEMMERICH'S EXTRACT OF MEAT.—Mr. CHARLES H. PIESSE, F.C.S., Public Analyst: "As the result of my careful examination of the Extract of Meat (E. Kemmerich & Co.), I find it to be absolutely pure. It contains a very large percentage of solid constituents of Meat. The nutritive value is of the highest order."

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WALKER & DALRYMPLE'S BROKEN-LEAF TEA, 1s. 8d. per lb.

A MONEY SAVING TEA. ABSOLUTELY PURE. The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.

Prospectus and samples free on application.

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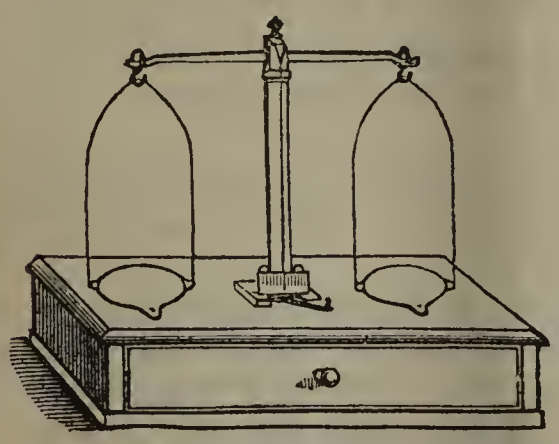

No. 1.—Balance on French polished box, with drawer, drop lever, bows & moveable pans. Can be charged up to 2 oz. in each pan, 7½ beam. Sensitive to 1-20th of a grain. £1 15s. This balance was strongly recommended by Professor Redwood. See *Pharmaceutical Journal*, April 9th, 1881.

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Send for Price Lists of Balances and Weights to

W. STONE, *Surveying Instrument and Heliograph Maker*, 44, GLOUCESTER ST., QUEEN'S SQ., BLOOMSBURY, LONDON, W.C.

The London Hospital and Medical College, Mile End, E.—The SESSION 1882-83 will commence on Monday, October 2, 1882. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other Hospital appointments are free. The resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis. MUNRO SCOTT, Warden.

THE MANCHESTER COLLEGE OF PHARMACY

225, OXFORD STREET, MANCHESTER.

PRINCIPAL ... ... MR. W. S. TURNER.

This School is especially designed to supply the needs of Students working for the Examinations of the Pharmaceutical Society. Mr. TURNER having now had some years experience in teaching, and having passed a very good proportion of his men (8 *out of* 10 *during the last* NINE *months*), can adapt and explain the subjects so that students can *understand* as well as remember them.

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TULLY'S Postal System is the most successful method of preparing without leaving business. Fee—MINOR, One Guinea. PRELIMINARY, 10s. 6d. Send stamped envelope for particulars and *original Testimonials* (*not Copies*) to Mr. J. TULLY (Hills Prizeman), Chemist, Tunbridge Wells. Established 1872.

St. Thomas's Hospital Medical School, Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

King's College, London, Medical DEPARTMENT.

The WINTER SESSION will be opened on Monday, October 2nd, at 4 p.m., when the Distribution of Prizes will take place, and an Address be given by the Right Hon. W. H. Smith, M.P.

A Special Course of Instruction has been established for the Preliminary Scientific Examination at the University of London, including Inorganic Chemistry, Practical Chemistry, Practical Biology, Experimental Physics, Zoology, and Botany.

The following Entrance Scholarships will be given in October next, viz.:—

Two on the Warneford Foundation of £75 each, for previous Education in General Literature and Science.

Two by the Clothworkers' Company—one of £100 and one of £50—for proficiency in Science only.

Two on the Sambrooke Foundation, viz.:—one of £60 and one of £40, for proficiency in Literature and Science.

During the ensuing Session there will be awarded five Medical Scholarships, viz.:—one of £80, one of £30, and three of £20, for professional efficiency; one for Chemistry of £40; one of £50 for resident students only; and two Sambrooke Registrarships of £50 each.

Endowed Prizes of the value of 65 guineas and College Prizes of the value of £60 are also awarded annually.

For Prospectuses and other information apply personally, or by post-card, to J. W. Cunningham, Esq., King's College, London; or to Professor Bentley, Dean of the Department.

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PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. Minor.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, Chemist, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

PRELIMINARY.—Mr. T. S. Turner, Head Master Grammar School, Hingham, Norfolk, having been very successful in passing Candidates for this examination, is desirous of forming a Class of youths under 16, to read for the January examination. Fees from Sept. 11th to Dec. 22nd, £12, including board, lodging and loan of books. Full particulars and pass list on application.

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LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. Dawes, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

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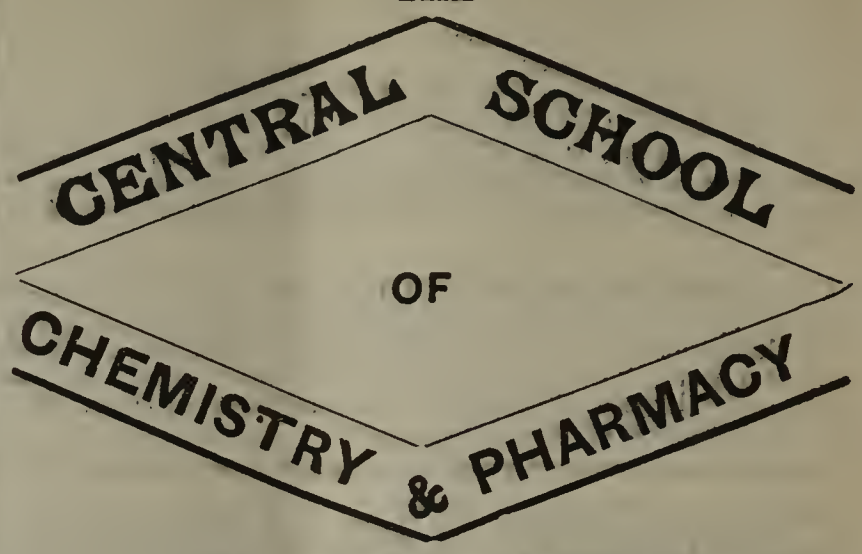

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

This School will re-open on Friday, September 1st, when classes will be formed for the October and December Examinations. Fee for tuition during the October Course, 6 guineas; to December, 10 guineas; for the entire session, extending to July, 1883, 20 guineas. Apply to

Messrs. LUFF & WOODLAND.

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(*From the Royal School of Mines*),
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A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER and DECEMBER candidates. Enclose stamp for particulars.

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Principals seeking Juniors or unqualified Assistants can have names submitted free of charge.

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325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.
For Syllabus, &c., apply to W. BAXTER, Secretary.

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

At the Examinations held in June, the following Students passed from this College:—

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" W. T. COOMBS
" T. F. ELTON
" A. HILL
" U. A. COATES
Mr. J. HUMPHRIES
" J. RICKETTS
" G. SPENCER
" C. L. THOMPSON
" W. TWISS

At the Examinations held in July, the following Students passed from this College:—

MAJOR.

Mr. F. HOLMES
Mr. G. MURRAY
Mr. J. WHEATLEY.

MINOR.

Mr. J. H. BELL
" A. W. BERRY
" J. BOWERING
" H. W. CAVE
" E. E. COMER
" H. E. CULLWICK
" G. DANIEL
" H. ELEY
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" A. PELLEW
" W. PICKERING
" R. PINDER
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" T. W. ROWLAND
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" J. H. THOMAS
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The Eleventh Session will commence on Friday, Sept. 1.

FEES.

Until the October Examination...	**£4 4s.**
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WHOLESALE Drug and Sundry. Provincial. As TRAVELLER or WAREHOUSEMAN, by a well educated man, age 30, who has been for the last 6 years in the largest retail trade in London. X. Y., 105, Dalyell Rd., Brixton, London.

AS JUNIOR, in a Dispensing and light Retail, in a healthy neighbourhood, with home comforts. In his 19th year. 3½ years' experience. Excellent references. W. G. MORGAN, The Cottage, St. Clears.

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AS MANAGER or out-door ASSISTANT, temporary or otherwise. Age 26. West-end reference. Disengaged 2nd week Sept. ALPHA, 9, Shilden St., Paddington, W.

A CHEMIST wishes to place his son (aged 16, passed Preliminary) where he will thoroughly learn the business and have a comfortable and Christian home. State particulars and most favourable terms to F. B., 26, Brockley Rd., Lewisham, S.E.

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AS MANAGER, out-door, or to Manage a Branch Retail in London, by a Pharmaceutical Chemist. Age 46. 5ft. 8in. References to present and past employers. For carte and full particulars, R. J. P., care of Mr. H. JUDD, 44, Argyle Sq., W.C.

AS DISPENSER to a Surgeon, part or whole time. Good Prescriber, &c. Age 24. Small salary. A. B., 11, Georgiana St., Camden Town.

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AT once.—For Pharmaceutical Laboratory, an experienced Working FOREMAN, thoroughly competent to undertake the manufacture of all Pharmaceutical Preparations. Apply to BURGOYNE, BURBIDGES & Co., 16, Coleman St., E.C.

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SOUTH France.—Two competent ASSISTANTS (Minor) of good presence and address. One from October 1st to end of May, who must know French and French Pharmacy. One from December 1st to end of March, who need not have had French experience. Full particulars to POWELL, Pharmacien, Hyères (Var).

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SEPT. 20th.—An ASSISTANT, thoroughly competent to take entire charge of a light Retail, Prescribing and Dispensing business. Must be a good Counterman. State age, height, salary, and all previous engagements, and enclose carte. Applications not replied to in 4 days to be considered as respectfully declined. J. GRIFFITHS RICHARDS, Hastings.

JUNIOR, for a good-class business near town. Must be a good Dispenser. A comfortable home. Time for study, 1 evening a week, and every other Sunday allowed. Full particulars of height, age, salary and references, with photo. (returnable), to C. D., Messrs. Hill & Son, 101, Southwark St., London.

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AN IMPROVER, about 18, for an old-established light business in London, close to a large park. Apply to, or address, E. G. MORRIS, 223, Deptford Lower Rd., London, S.E.

A JUNIOR ASSISTANT. Apply personally to T. P. JONES, 82, Seven Sisters' Rd., N.

AT once.—Steady, energetic, married ASSISTANT, to Manage Branch and live on premises. A good Prescriber and Tooth Extractor. A Registered Chemist and Mechanical and Surgical Dentist would be treated with. State salary required, with fullest particulars. Applications not answered in 3 days declined. BENTLEY, Chemist, Goole.

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A JUNIOR or IMPROVER, at once, in a Mixed business, a short distance from London. Apply, with particulars, stating salary required, by letter, to L. M., care of Medcalf & Co., 53A, City Rd., London.

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ASSISTANT, well up in every branch of the business. Good references. One seeking permanency preferred. To save time send photo., and state age, height, salary, &c. W. S. HARVEY, The Central Pharmacy, Margate. Also an APPRENTICE.

ASSISTANT. Qualified. Capable of Management during absence. Who has had experience in better class of country business. Obliging, and good address. Hours about 8 till 8. Sunday duty nominal. Apply, stating salary and details of experience, to F. CLARIDGE, Chemist, Warwick.

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AN ASSISTANT. Minor qualification. Age from 25 to 35. Single. For a Branch business. Good situation. Apply personally or by letter to Mr. POTT, Chemist, Lower Tranmere, Birkenhead.

A COMPETENT ASSISTANT, in-doors, for a Mixed country business. Apply, stating age, height, salary, and with usual particulars as to experience, &c., to C. BIRKETT, Bowness-on-Windermere. Applications not answered in 3 days are declined.

BY September 9th.—A qualified ASSISTANT (single), of good character, able to take Management, in light Retail and Dispensing business. Seaside. One able to Extract Teeth preferred. Apply, W. H. LAVERACK, Malton.

MANAGER for Branch. Well up in Dispensing. Indoor. State age, height, salary required, and enclose carte, to be returned, with reference, to ROBERT P. ROE, 29, Green Lane, Liverpool.

VACANCY for an APPRENTICE, also a Junior ASSISTANT, in an old-established Dispensing business. No Sunday duty. Address, with fullest particulars, HUES, Chemist, Handsworth, Birmingham.

ASSISTANTS WANTED.

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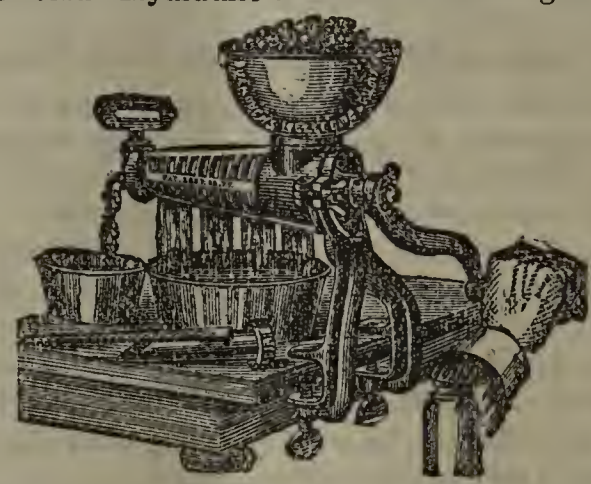

in this respect that the *Chemists' Journal* has humorously remarked of it that "it will almost squeeze blood out of a turnip." One firm informs us that they have saved at least £20 more in three months, by the use of this Press, than they could secure by using any other. The working of this Press being continuous, either small or very large quantities may be operated upon at one time, and much more rapidly than in any other form of apparatus.

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The
Pharmaceutical Journal
AND
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THIRD SERIES, No. 636.] SATURDAY, SEPTEMBER 2, 1882. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first **Tuesdays** in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
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* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Friday, October 6th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

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INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, will commence on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

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Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

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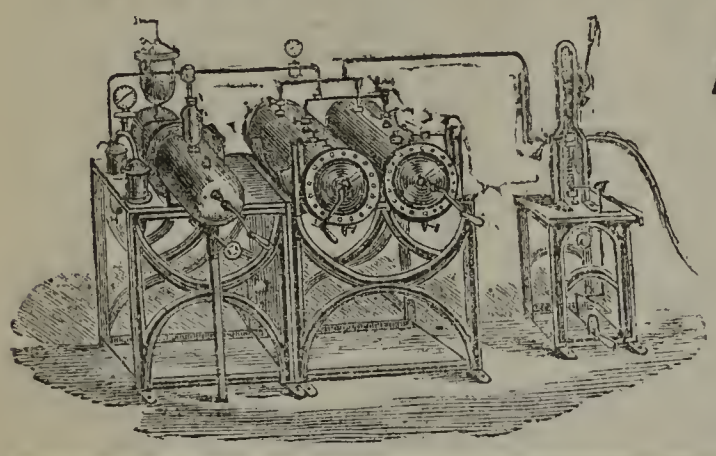

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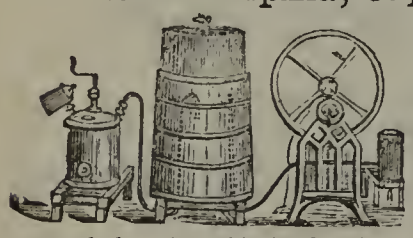

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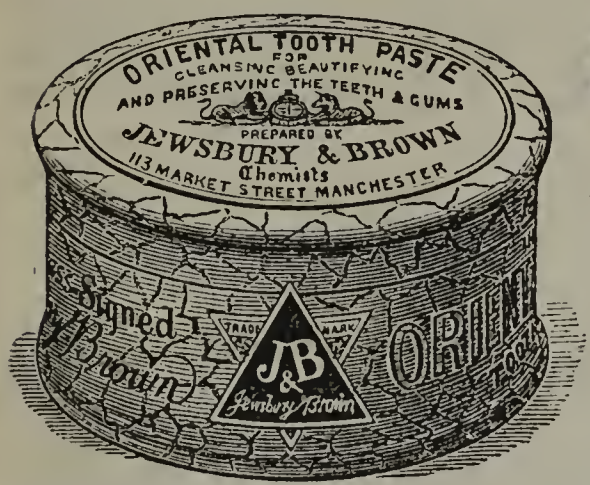

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"THE MONTH."

Although August must decidedly be reckoned among the "dead" months of the year, it shares with September the fortune of being galvanized into some appearance of life by various *soi-disant* scientific meetings. Three such meetings have taken place during the past month, all of them more or less interesting to the pharmacist: the British Medical Association has met at Worcester, and the British Pharmaceutical Conference and the British Association for the Advancement of Science at Southampton.

First in order of date came the meeting of the British Medical Association, which possessed additional interest from the fact that it marked the expiration of fifty years since the establishment of the Association, under the name of the "Provincial Medical and Surgical Association," in the same old city of Worcester in 1832. Then the Association numbered 140 members; now it numbers 9500. But it made comparatively slow advance in its early history, only numbering about 2000 members at the end of its twenty-fifth year; in fact, the medical profession generally exhibited relatively little appreciation of the advantages involved in membership of the organization until about sixteen years ago, when Mr. Ernest Hart was appointed Editor of the Journal of the Association, since which time its progress has been very rapid. It was natural that Dr. W. Strange, the President for the year, should in his address contrast the position of medicine at the epoch of the birth of the Association and now, and the first portion of it was devoted to the "Revival of Medicine," as part of the outburst of the forces of thought and research after the repression due to the effects of a long period of war, whilst the second was entitled "The Survival of Medicine." The orator credited medical literature with being one of the chief of the forces that have operated to bring about great changes during the last fifty years, but in acknowledging the valuable services rendered by the *Lancet* he used a decidedly double-edged metaphor. After comparing that journal in its earlier years to a wasp buzzing about the drones of the medical hive, when he came to speak of it after its enlargement in 1831, he altered the figure. "We may now liken it to a weasel, or a still more unsavoury animal, the polecat, biting, scratching, driving out of their holes, with venomous scurrility, the 'bats,' as it called the hospital surgeons and councillors of the Royal College, and hanging them up, like vermin on a barn-door, to general obloquy. This was the function of the *Lancet*." The *Lancet* of to-day is naturally not quite pleased with this simile, although one certainly in accord with Dogberry's statement that "comparisons are odorous," and it quotes with some complacency a suggestion that weasels and polecats are not usually engaged in nailing bats to barn-doors; but it is willing to forgive this and much more in consideration of the kind manner in which Dr. Strange spoke of the late Mr. Wakley, and it assures its readers that the spirit in which that gentleman conducted the *Lancet* "is religiously, it may be said filially, preserved under the present Editor." If Dr. Strange's eulogy is of rather uncertain sound, the same cannot be said of his condemnations, as for instance, when he attacks the well-known "nuisance of modern medical literature," that "many a fresh investigator will treat his subject as if no one had ever done anything in it before." His utterances, also, respecting some of the evils attending modern consultations are no less sharp than true. "As regards consultants," he asks, "do we not recognize a solemn farce when Mr. A. or Mrs. B. returns from consulting, say some metropolitan celebrity, and tells us that Dr. C. has laid down all the rules for his or her future life, and indicated this or that health-resort as essential to recovery; and all in ten minutes' time and for a fee of one guinea? The issues of life and death, in the case of a stranger never seen before, solved in a ten or fifteen minutes' interview, and all for one guinea!" The "Address in Medicine" was delivered by Dr. W. F. Wade, and the "Address in Surgery" by Professor W. Stokes.

Next in order of time came the meeting of the British Pharmaceutical Conference, but the full report of the proceedings in another part of the Journal renders further notice here unnecessary. Then came the meeting of the British Association, with its sections covering all the fields of science. Amongst the topics dealt with by Dr. Siemens in his presidential address was that of artificial lighting, upon which he could speak with authority, consequent upon the work that he has done in improving the methods of lighting by both gas and electricity. It is therefore interesting to note that he thinks "gas lighting will hold its own as the poor man's friend." Its convenience as a lighting and heating agent constitutes gas "an institution of the utmost value to the artizan," and he considers "the time is not far distant when both rich and poor will largely resort to gas as the most convenient, the cleanest, and the cheapest of heating agents, and when raw coal will be seen only at the colliery or the gasworks." In a paper read before the Mechanical Science Section, Mr. William Sugg expressed a similar opinion as to the future of gas and said that at present the greatest hindrance to improvements was met with in those members of the public who supply themselves with the lowest priced burners and stoves they can buy and then blame the quality of the gas. He believes that if the consumers of gas would only acquire a moderate amount of information as to its properties, they would be enabled to use it with greater economy and comfort to themselves, and he considers that the easy manner in which gas can be made to produce either the light of a rushlight or the blaze of a thousand candles by a mere turn of the wrist, joined to the readiness by which it can be conveyed from one place to another, will always insure for it a large and increasing demand. Indeed there can be little doubt as to the future of gas, and the growing importance of the long list of substances mentioned by Dr. Siemens, which are looked upon at present as by-products in its manufacture, renders it probable that the time is not far distant when these will become the principal objects of the distillation of coal, and "gas" will take their place as a by-product. The address of the President of the Chemical Section, Professor G. D. Liveing, had for its subject the advance made in the dynamics of chemistry. In the Botanical Department of the Biological Section, Professor Lawson delivered an address on the progress of systematic botany during the last eight years.

In the Mechanical Science Section, also, a most interesting paper on "Recent Progress in Telephony" was read by Mr. W. H. Preece, of the General Post Office. Only six years have elapsed since the tele-

phone was first mentioned to a British audience, at Glasgow, by Sir William Thompson, and now it is in practical use, more than a million and a half sterling is invested in its working in this country alone, and it is earning an annual revenue of more than £100,000. It is worthy of note that the original telephone receiver of Bell has scarcely been improved upon. The principal difficulty attending the use of the telephone is not due to any defect in the instrument itself, but to disturbing influences external to it. It is so sensitive that the minute quantity of electricity which makes up the currents is easily absorbed by competing conductors. When two or more telephone conductors run side by side, what is said on one can be overheard on the others, and when a telephone wire extends alongside telegraph wires every current on the telegraph circuit is repeated in the telephone, giving rise to a hissing bubbling sound which on busy lines entirely drowns speech. The only remedy for this evil at present found practically effective is to employ a complete metallic circuit, so contrived that the two wires are in very close proximity to each other or that they twist round each other so as to maintain a mean average equality of distance between themselves and the disturbing wires. The telephone has established beyond doubt the fact that currents of electricity actually traverse the earth's crust. Several cases are on record in which telephone circuits miles away from any telegraph wires, but in a line with the earth terminals, have picked up telegraphic signals. When, too, an electric light system uses the earth it stops all telephonic communication in the neighbourhood; on one day the whole telephonic communication of Manchester broke down from this cause, and on another occasion, in the city of London, the effect was so strong as not only to destroy telephonic communication but to ring the bells also. A telephone circuit in connection with the earth gives distinct evidence of every visible flash of lightning and there have been several cases of persons being knocked down while experimenting during a thunderstorm, though no personal injury has been sustained. In England the use of double wires diminishes danger from this source to a minimum, but on the continent and in America, where single wires are used, telephones are invariably protected by a lightning arrester.

An extremely interesting experiment has recently been made as to whether it is possible to communicate by means of electricity across seas and channels without the aid of wires. Large metal plates were immersed in the sea on opposite sides of the Solent, one set at Portsmouth and Ryde, six miles apart, and another set at Hurst Castle and Sconce Point, one mile apart. The Portsmouth and Hurst Castle plates were connected by a wire passing through Southampton, the Ryde and Sconce Point plates by a wire passing through Newport, the circuit being completed by the sea. The experiment was so far successful that signals were passed easily so as to be read by the Morse system, but communication by telephone was not found practicable.

The well-known theory of Dr. Andrews, that the liquid and gaseous states of matter are continuous, has been questioned by more than one observer, and Dr. J. B. Hannay, as the result of several hundreds of experiments wherein hydrogen was compressed over various liquids in which it is insoluble, has arrived at the conclusion that the two states are not more continuous than are the solid and liquid states, but are separated by an isothermal passing through the critical point. He points out (*Nature*, August 17) that by Andrews's method, where the liquid is in contact with its own vapour, the critical point is the only period when the direct passage from liquid to gas is visible, whilst the employment of hydrogen for retaining a free surface allows of the observation of the passage at any pressure, and he states that it takes place as suddenly at two hundred atmospheres pressure as the critical pressure. In fact he considers that the irregularities observed by Dr. Andrews in the vicinity of the critical point rather lend support to the view that a change of state takes place there. He states the change thus:—"The cohesion of the liquid state is weakened as the thermal motion increases, till the repulsion is in excess of the attraction and the gaseous state ensues." So far from the gaseous state of matter being continuous and indistinguishable, he considers that the liquid limit or absolute boiling point is the only fixed point among the properties of matter, and he proposes to give to it the name of the "cohesion limit."

It is known that metals can be volatilized, but in order to effect this in air or gas at the ordinary pressure, high temperatures are required, the employment of the electric arc being frequently necessary. Some experiments have been made by M. Demarçay to ascertain whether the temperature at which volatilization takes place is affected by diminishing the pressure. He reports (*Comptes Rendus*, xcv., 183) that so far as he has gone he finds that only a comparatively low temperature is required. When a metal is heated in a vacuum there is generally at the commencement a disengagement of gas which ceases after a time varying with the metal, and then a blackish layer is deposited upon a cool surface, which eventually takes a metallic aspect. The temperatures required for volatilization of the metals experimented with were—cadmium, 160° C.; zinc, 184° C.; antimony and bismuth, 292° C.; lead and tin, 360° C. If proper precautions are not taken, a thin layer of sub-oxide is formed on the surface of the metal when it is first heated, and this being less volatile than the metal prevents the volatilization until a temperature is reached much higher than those mentioned. A fissure appears then to be formed in the superficial coating of sub-oxide, and the deposit of volatilized metal commences suddenly. The author purposes to extend his experiments to platinum and iron.

Last month reference was made to experiments which appeared to show a relation between the molecular weights and melting points of certain groups of compounds. A paper communicated to the Academy of Sciences by M. Raoult (*Comptes Rendus*, xcv., 187) points to the existence of a physical constant at the other end of the scale. M. Raoult's experiments were made to determine the extent to which the freezing point of a liquid is lowered by the solution in it of various substances. Using chemically pure benzine, freezing at 4·96° C., he dissolved in it definite proportions of a series of compounds belonging to the groups of hydrocarbons, ethers and aldehydes. It was found that the coefficient of depression (*i.e.* the lowering of the point of congelation due to 1 gram of substance dissolved in 100 grams of benzine) varied considerably, but that if this coefficient of any of these bodies were multiplied by the molecular weight, the product was approxi-

mately constant, always being close to the number 50. The author deduces the law that acetones, ethers, hydrocarbons, and their derivatives, when dissolved in benzine in quantities proportional to their molecular weight, all lower the point of congelation of that liquid nearly the same number of degrees. At present it would appear that this property is independent of the nature, number or arrangement of the atoms composing the dissolved molecules.

In the *Scientific American* for August 12, there is a very interesting description of the arrangements for the supply of water to the city of Rochester in New York State. The city has two sources of supply, the water for fire and manufacturing purposes and the distribution of power being taken from the Genesee river, and the sweet water from Hemlock Lake, about thirty miles distant. The water is conveyed from the lake in iron pipes to a storage reservoir, and from thence to a distributing reservoir which is 117 feet below the level of the storage reservoir. This difference in level is taken advantage of for the purpose of thoroughly aërating the water before it is distributed into the city during warm weather, which is done by means of a fountain placed in the middle of the distributing reservoir. The fountain consists of a 24-inch pipe, turned vertrically upwards, enlarged near the top to a diameter of 3 feet, and closed by means of a dome-shaped head provided with twenty-one orifices which may each be reduced in diameter or closed as desired. Through these orifices the whole of the sweet water for the supply of the city issues in jets, and is thus thoroughly exposed to the action of the atmosphere. The fountain is said to be visible in clear weather for a distance of many miles, and when all the orifices are closed except the centre one, and that is reduced to a diameter of 3 inches, the jet of water rises to the height of nearly 110 feet above the surface of the water in the distributing reservoir, or within $7\frac{1}{2}$ feet of the elevation of its source in the storage reservoir $8\frac{3}{4}$ miles distant. The amount of water supplied daily in this way from Hemlock Lake is about three million gallons.

So many alkaloidal compounds have now been obtained from cinchona barks that the terminology has become sufficiently perplexing to render the elimination of any surplus names welcome. Some months ago Dr. Hesse described (*Pharm. Journ.*, [3], xii., 179), under the name "cinchamidine," an alkaloid obtained from the mother-liquor during the purification of homocinchonidine sulphate. He afterwards expressed an opinion (*Pharm. Journ.* [3], xii., 904), that this base was probably identical with Messrs. Forst and Böhringer's hydrocinchonidine, prepared by them from pure cinchonidine, but the formula calculated by him from the results of an analysis of the acid platino-chloride differed by 1 atom of carbon from that given by the other observers. Subsequent experiments have, however, induced Dr. Hesse to think that the excess of carbon was due to the presence of some neutral platinochloride in the salt analysed, and he now adopts for the alkaloid the formula of $C_{19}H_{24}N_2O$ and also the name "hydrocinchonidine" (*Annalen*, ccxiv., 1), since it appears to stand in the same relation to cinchonidine as hydroquinine does to quinine. Hydrocinchonidine is said to occur frequently in commercial preparations of cinchonidine and homocinchonidine, and Dr. Hesse describes several of its salts.

Further, Messrs. Forst and Böhringer have arrived at the conclusion (*Berichte*, xv., 1656) that the hydroconchinine separated by Dr. Hesse from the mother-liquors of quinidine (conchinine) sulphate is identical with the alkaloid obtained by them in the oxidation of quinidine by means of potassium permanganate, and called by them "hydroquinidine" ($C_{20}H_{26}N_2O + 2\frac{1}{2}H_2O$). They state that they have found hydroquinidine in samples of quinidine sulphate from various sources, and it would therefore appear to be a constant companion of quinidine in cinchona barks, just as cinchotine is of cinchonine, hydrocinchonidine of cinchonidine and hydroquinine of quinine. When an aqueous solution of the neutral sulphate is evaporated slowly, crystals are obtained containing 12 molecules of water of crystallization.

On the other hand Messrs. Forst and Böhringer have added to the cinchona terminology (*Berichte*, xv., 1659) the term "chitenidine," which they apply to an alkaloidal compound resembling chitenine that is formed, together with hydroquinidine and formic acid, in the oxidation of quinidine. This body had previously been observed, but not investigated, by Skraup. It is rather freely soluble in hot water, not so soluble in cold water, and still more difficultly soluble in alcohol. Its solution in dilute sulphuric acid has a blue fluorescence, which disappears upon the addition of hydrochloric acid. It is represented by the formula $C_{19}H_{22}N_2O_4 + 2H_2O$.

Professor G. Planchon, in the *Journal de Pharmacie*, this month, throws some fresh light on the source of cuprea bark. A microscopical examination of the specimens supplied to him by M. Triana showed that the barks derived from Bucaramanga, in the north, and from Llanos, the southern district, both present the same characters and are evidently both furnished by *Remijia pedunculata*. The cinchonamine bark of M. Arnaud presents different microscopical characters, and is referred by M. Planchon to *R. Purdieana*. He remarks that a microscopical examination has never yet deceived him in the solution of like problems. A singular confirmation of the value of this method of research occurs in the form of a postscript to M. Planchon's article, in which he states that since it was written M. Triana has received information to the effect that the cinchonamine bark does not come direct from Bucaramanga, but only passes through it, being collected near Antioquia on the other side of the Magdalena river. Further, that a large exporter of the cuprea bark has recognized the southern bark as the produce of *R. pedunculata*.

The products of the distillation of brucine with potash have been studied by M. Koninck (*Comptes Rendus*, xcv., 298). The crude product consisted of an oily mixture, presenting considerable analogy to the crude chinoleine resulting from the decomposition of cinchonine by potash. A considerable quantity of this oil was submitted to fractional distillation. The fractions between 90° and 140° C. were small and contained neutral and basic products; those between 140° and 160° contained a small quantity of a pyridic base, insoluble in water and having the composition of lutidine. Three fractions between 165° and 200° contained, the first a base presenting the principal characters of β-lutidine, the second a collidine probably identical with α-collidine, and the third a base identical with β-collidine, all three of which have been obtained from the chinoleine derived from cinchonine.

One of the reports to the Scientific Grants Committee of the British Medical Association, presented at the recent meeting at Worcester, contained a *résumé* by Dr. G. Thin of some of the results of his investigation upon the "Pathology of Parasitic Diseases of the Skin." With regard to the fungus of ringworm (*Trichophyton tonsurans*) he is of opinion that it is not a form of a common fungus, as has been supposed by some observers. He found that it could be cultivated artificially when moistened by vitreous humour, but when completely immersed in vitreous humour there was no evidence of its growth. This would appear to explain what takes place when in the treatment of ringworm recourse is had to applications which provoke inflammation, *i.e.*, an effusion of serum around the follicles, in which the *Trichophyton* cannot develope. In ringworm of the scalp, Dr. Thin says considerable caution is necessary in the choice of an application for provoking this curative inflammation; but in ringworm of the body, the parasite is so well within reach that it can be easily destroyed by one application of tincture of iodine and subsequent scrubbing with soap and water. With respect to *Microsporon furfur*, the fungus of pityriasis, and *Achorion Schœnleinii*, the fungus of favus, he has only obtained negative results. The destruction of the hair in *Alopecia areata* he considers to be due to minute bodies of definite and fixed shape and size, which are found in and on the hairs. They are distinct from the granular elements in hairs and are neither oily particles nor crystals, but have the refractive properties of and are bacteria (*Bacterium decalvans*). The disappearance of the hair, resulting in baldness, is due to a breaking up of the hair shaft by the multiplication in it of these organs.

The phenomena attending the preparation of a very alcoholic American-Indian beverage, called "chicha," from ungerminated maize, have been investigated by M. Marcano (*Comptes Rendus*, xcv., 345). The peculiarity consists chiefly in the active fermentation which goes on in a mass consisting nearly exclusively of starch that has not undergone any alteration except that produced by a short boiling with water. It was ascertained that this fermentation is coincident with the reproduction of well-defined vibrionic organisms, which were found on the outer pellicle of the maize grains, and also of the stalk. These organisms proved capable of resisting the action of boiling water during several minutes; they appeared to be most active at a temperature between 40° and 50°C., at which temperature they caused the fermentation of mannite, sugar of milk, saccharose and glucose. They seem to act directly upon young starch, such as occurs in the embryo of the grain; but also attack mature starch, though more slowly. In both cases there is a production of dextrine, carbonic acid gas, and alcohol.

An infusion of the curious scarlet seeds of the *Abrus precatorius* has long been used in the interior of Brazil as a popular remedy in the treatment of ophthalmic disorders. In some experiments made by Dr. de Wecker (*Comptes Rendus*, xcv., 299) to test the action of this remedy he found that a weak cold infusion, made from the powdered seeds, when applied as a lotion, rapidly produced a purulent ophthalmia of intensity corresponding to the number of applications made. The factitious ophthalmia thus produced disappeared in the course of ten days or a fortnight without any therapeutic intervention or danger to the cornea, and Dr. de Wecker is of opinion that this property possessed by the seeds of provoking a very intense ophthalmia of short duration could be utilized in ocular therapeutics in the treatment of granulations, conjunctival diphtheria, etc. The leaves of the plant are also used in the east as a remedy in croupal cough.

Dr. J. Ott describes, in *New Remedies* (p. 226), the physiological action of *Astragalus mollissimus*, one of the "loco" or crazy weeds of the Western States. Animals eat this plant when grass is scarce, and having once tasted it, they leave the sweetest grasses to eat the "loco." Two other plants are eaten by them in the same way, viz., *Oxytropis Lamberti* and *Sophoria sericea*. He finds that the astragalus is a powerful mydriatic, that it increases the flow of saliva, has a spinal tetanic action, a stupefying action on the brain, and reduces the force and frequency of the heart, killing mainly by arresting its action.

Evidence is brought forward in the *British Medical Journal* (p. 178) that the official solution of atropine of the British Pharmacopœia is liable to produce glaucoma, and that a very much weaker solution would serve to produce mydriasis or dilatation of the pupil. Dr. Ringer is of opinion that a solution formed by diluting the Pharmacopœia liquor with two or three hundred times its bulk of water would be sufficiently strong.

Dr. J. Lattey, writing to the same journal (p. 199), states that salicin possesses the peculiar property of relieving after-pains when opium is quite useless. He gives 15 grains for a dose, repeated every two hours until the pain ceases. He states he has never had to give more than three doses, two being usually effectual.

Dr. D. H. Cullimore records, in the *Lancet* (p. 216), a case of hydrophobia successfully treated by aconite, administered in conjunction with bromide of potassium and tincture of cinchona.

Dr. F. Hutchinson, of Scarborough, calls attention, in the *British Medical Journal* (p. 209), to the value of the local application of tincture of iodine in erysipelas, the effect in a case which came under his notice appearing to be almost magical. He does not attempt, however, to explain the action of the drug.

Dr. Schafer, in the *Berlin. klein. Wochenschrift* (*Therap. Gazette*, p. 266), has described a new use for Calabar bean. Having observed that it causes tetanus of the muscular coats of the intestines in animals, he tried it in cases of obstinate constipation dependent on atony of the coats of the bowels. The strength he used was, ext. physostigma, 0·05 gram; glycerine, 10·00 grams. A dose of six drops every three hours during the day gave relief in twenty-six hours.

Messrs. Heckel, Mourson and Schlagdenhauffen have sent to the French Academy (*Comptes Rendus*, xcv. 196) an account of the physiological action of globularine, $C_{15}H_{20}O_8$, and globularetine. The former in doses of 0·15 to 0·56 gram acts somewhat like theine; but in doses of 0·65 gram it produces toxic symptoms, lowering the pulse and the temperature and causing vertigo, headache, shivering, pain in the limbs, etc. It is this principle which has given to *Globularia* the reputation of having poisonous properties, and in consequence of which it obtained the name of *Frutex terribilis*. The globularetine, C_9H_6O, or resin of *Globularia*, is the purgative principle, but its action is less than that of the decoction

of the plant, probably because in a natural state it is combined with mannite. It acts more rapidly as a purgative if dissolved in an alkaline solution. It resembles chrysophanic acid and aloin in the character of its effects, the dose varying from 0·125 gram to 1 gram. It also has a powerful action on the kidneys, raising the amount of solid matter excreted one-third above the normal quantity. Globularetine is very difficult to obtain in a state of purity, being always accompanied by a volatile principle which has a diuretic action.

According to Merck's Trade Report, experiments made by Dr. Hiller in the Charité at Berlin have shown that perfectly pure colocynthin is an excellent purgative, entirely devoid of the toxic and drastic effect produced by extract of colocynth. It is administered internally in doses of 1½ to 6 grains. It is a yellowish-white powder of a purely bitter taste, very soluble in water and alcohol.

Dr. Meredith, in the *Birmingham Medical Review*, recommends oil of peppermint as an external application for allaying the neuralgic pain so often complained of in cases of *Herpes zoster*. He has used it with great relief to the patient even when the eruption was out in a fresh florid condition (*Practitioner*, p. 134). He thinks that the value of this remedy in relieving neuralgic pain deserves to be better known.

Dr. E. Thompson recalls attention, in the *Lancet* (July 29, p. 136), to the use of the giant puff-ball, *Lycoperdon giganteum*, as a local hæmostatic. He states that it forms a most soft and comfortable surgical dressing, and that the powder it contains seems to possess antiseptic and anodyne properties. The mature plant is used. At this period it is about the size of a child's head and is covered with a thin skin; the latter is removed, and the capillitium and spores which form a dusty mass are used. Mr. Fagan, a leading surgeon in Belfast, found that it at once restrained bleeding from arteries in the bone in the neighbourhood of the orbit, after the failure of other means. The researches of Hayem (*Lancet*, p. 146), on the reason of the coagulation of the blood, show that the hæmostatic action of the puff-ball, as well as of all other spongy or powdery substances, depends upon the fact that healthy blood deposits hæmatoblasts or minute corpuscles on any foreign substance introduced into a vein, which become adhesive points for the subsequent attachment of particles of fibrin. This action, however, also takes place when the vessels themselves assume abnormal conditions, as when cut or altered by disease. The hæmatoblasts undergo change and become confluent more rapidly under the influence of warmth, which explains the power of warm water to arrest hæmorrhage. The hæmorrhagic tendency is believed to depend upon the absence from or small quantity of hæmatoblasts in the blood, since transfusion of blood has been found to arrest hæmorrhage in such cases.

MM. Weber and Thomas, of the French army (*Lancet*, p. 152), state that they have prepared tow in a chemically pure state, of perfect whiteness, soft, very elastic and readily absorbent, easily impregnated with antiseptics, and cheap. It is obtained by treating ordinary tow with caustic soda, and afterwards washing with solution of hypochlorite of soda to bleach it, the alkali being subsequently removed by hydrochloric acid. The cost of the tow is stated to be 1½ fr. to 1¾ fr. per kilo, or when carbolized 2 fr. to 2½ fr. per kilo. To impregnate it with carbolic acid, a solution of 3 parts of the acid in 2 of alcohol is sprinkled on sheets of filter paper laid between sheets of tow and placed in a closed box. In forty-eight hours the acid is said to pass entirely into the tow. The tow is thus made to contain 10 per cent. of carbolic acid.

The medical papers are now largely discussing phthisis from various aspects, and it is within the limits of possibility that the pharmaceutical chemist may be called upon to provide test solutions for detecting the *Bacillus tuberculosus*. It may be as well for him to know therefore that Dr. H. Gibbes, Curator of the King's College Museum, London, publishes, in the *Lancet* (p. 183), a new method of detecting the *Bacillus tuberculosus* in phthisical sputa, which he says he has found more successful than either Koch's or Ehrlich's process. The solutions he uses are those of magenta crystals and chrysoidin, and the formula given is:—Magenta crystals, 2 grams; pure aniline, 3 grams; alcohol, specific gravity ·830, and distilled water, 20 cubic centimetres. The aniline is dissolved in the spirit and then rubbed up with the magenta in a glass mortar, adding the spirit gradually until all is dissolved, then adding the water slowly while stirring. The solution should be kept in a stoppered bottle. The solution of chrysoidin is a saturated one in distilled water, a crystal of thymol being added to preserve it. Dilute nitric acid, made of 1 part of commercial acid and 2 of distilled water, is used to remove the excess of colour after using the magenta stain. According to Dr. Gibbes the bacilli, when mounted, can be detected with daylight by an ordinary ¼ inch objective, and a ⅛ dry glass will show with the same illumination that they are rows of spherical bodies.

In the *Medical Times and Gazette* (p. 165), appears an official report from Surgeon-Major T. Edmonston Charles, of the Indian army, recommending the use of coca for assuaging thirst during great exertion in hot countries. He is so satisfied as to its thirst-assuaging powers that he remarks, "Had our troops been provided with this leaf in Afghanistan, instead of the disaster after Maiwand our military historians would have had to chronicle a strategic movement to the rear on Candahar. Had the Russian detachment possessed this leaf they would have reached Khiva over the route they were sent to cross instead of having been forced to relinquish the attempt and retire demoralized with their ranks thinned by death in consequence of want of water." He states also that he has seen an infusion of coca relieve the intense headache of nervous exhaustion, ward off the failure of nerve power during prolonged fever, and enable patients to struggle through other exhausting diseases. That coca does possess valuable properties in the fresh state there can be but little doubt, or it would not be so extensively used in Bolivia and Peru, but the leaves as imported into this country do not generally seem to possess the activity with which they are credited by Dr. Charles. Even in Bolivia "coca fresca" is always used, the leaves, as the writer is assured by a resident in Bolivia, being never kept for more than three months. How far the activity of the drug may be due to a volatile oil, as in coffee, has yet to be determined, but a tincture prepared from the fresh leaves by a careful pharmacist would be fitter for experiment than the dried leaves. The coca plant is now being cultivated in Ceylon, and if the experiment be tried, as Dr. Charles suggests, with the Indian contingent sent to Egypt, some interesting results may be obtained.

The stacte of Scripture has been generally referred to liquid storax. But Mr. Heathcote, of Inhambane, in Africa, points out that the native name for a resin found on the east coast and which is fragrant when pounded and burnt, or even when boiled in water, is stakate and staka. Of the tree yielding this resin, which he describes as a kind of copal, he has discovered a forest 200 miles long, running parallel with the coast and midway between it and the first range of mountains, and about 100 miles from Inhambane. This copal tree is remarkable for its enormous height, so that the trees look with respect to the others like an ordinary tree in a hayfield (*Nature*, p. 351). Mr. Heathcote has collected about six tons of the resin.

Whether the present mode of cultivating lavender (*i.e.*, growing it for four years only) is the best may be open to question, seeing how often old and large plants are covered with blossom. The *Gardeners' Chronicle* (p. 262) mentions two hedges of lavender, in the terrace-garden at Pusey Park, Faringdon, which are literally sheeted with blossom. The hedges are four feet or so in width, and make a free growth every summer, but they are cut back every September to a width of twenty inches or so, and break out again into profuse growth in spring.

Dr. Paul Sorauer, of Proskau, Silesia, has originated the idea of forming an international association of the botanists and entomologists most competent to study the diseases of plants and the means by which they may be obviated or cured (*Gardeners' Chronicle*, p. 176). Among the objects proposed are the collection of statistics respecting plant diseases under differences of locality, soil, climate, etc., observations on the power of particular varieties to resist disturbing influences, and experiments with a view to discover the best varieties of plants to be cultivated in different localities. Growers of henbane and lavender will doubtless be glad to forward observations to Dr. Sorauer, if they can only obtain in return information as to the best means of obviating the fungus disease in the lavender and of destroying the insect enemies of the henbane.

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 130.)

Ferri Tannas (*Tannate of Iron*).

Solution of chloride of iron (ferric; specific gravity, 1·480–1·484)	35
Tannic acid	30
Alcohol (stronger)	12
Water of ammonia	q.s.
Distilled water	q.s.

Dilute the solution of chloride of iron with 200 parts of distilled water; precipitate completely with water of ammonia, collect the precipitate, wash it well, and mix it with a solution of the tannic acid in 40 parts of distilled water. Macerate for a few hours, and then add the alcohol. Collect the precipitate upon a strainer, wash it, and dry it.

It should be a coal-black powder.

Plumbi Tannas (*Tannate of Lead*).

Solution of subacetate of lead	100
Tannic acid	38
Distilled water	q.s.

Dilute the solution of subacetate of lead with 500 parts of distilled water, and add to it the tannic acid, previously dissolved in 500 parts of distilled water. Let the mixture stand a few hours, collect the precipitate upon a filter, wash it with about 500 parts of cold distilled water, and dry it at 25°–30° C. (77°–86° F.).

Tinctura Alexipharmaca Huxhami (*Huxham's Compound Tincture*).

Huxham's Tincture (of Bark).

Red cinchona (Javanese or East Indian), in coarse powder	48
Orange peel, deprived of the inner white layer	36
Serpentaria, bruised	9
Saffron, finely cut	4
Stronger alcohol	240
Water	240

Macerate for seven days, express, and filter.

Tinctura Antasthmatica (*Anti-Asthmatic Tincture*).

Licorice root, cut and bruised	12
Iris (blue flag) root	6
Squill, dried and bruised	3
Saffron, finely cut	2
Alcohol	214
Benzoic acid	1
Sugar	18

Macerate the first four ingredients with the alcohol during fourteen days; then express and dissolve in the strained liquid the acid and sugar. Finally filter.

Tinctura Antifebrilis Warburgi (*Warburg's Fever Tincture*).

(Abbreviated Formula.)

Tincture of orange peel	5
Compound tincture of aloes	20
Stronger alcohol	15
Spirit of camphor	2
Sulphate of quinine	1

Dissolve the sulphate of quinine in the alcohol, and add the other liquids.

N.B.—Tincture of orange peel (Pharm. Neerl.) is prepared by macerating 1 part of sweet orange peel (only the outer yellow portion) with 6 parts of alcohol for fourteen days.

Compound tincture of aloes (Pharm. Neerl.) is prepared by mixing equal parts of tincture of aloes (aloes 1, alcohol 8), tincture of myrrh (myrrh 1, stronger alcohol 8), and tincture of saffron (saffron 1, alcohol 8).

Spirit of camphor (Pharm. Neerl.) is composed of camphor 1, stronger alcohol 12 parts.

Tinctura Chinoidini (*Tincture of Chinoidin*).

Purified chinoidin, in fine powder	2
Hydrochloric acid	1
Alcohol	17

Dissolve the chinoidin in the alcohol and acid, and filter.

Tinctura Digitalis Ætherea (*Ethereal Tincture of Digitalis*).

Digitalis, dried and in coarse powder	2
Ether	5
Stronger alcohol	15

Macerate during seven days, express, filter (avoiding loss by evaporation), and preserve the filtrate in a dark place.

Tinctura Gelsemii (*Tincture of Gelsemium*).

Gelsemium, in powder	1
Alcohol	10

Macerate during three days, express and filter.

Tinctura Hyracei (*Tincture of Hyraceum*).

Cape hyraceum	1
Distilled water	6
Stronger alcohol	2

Macerate the hyraceum during six days with the distilled water. Then add the alcohol and filter.

[We quote this, *not* for the purpose of advising its use, but to attach to it a criticism. We think the time has arrived when the unscientific, empirical use of excrementitious medicines should finally be abandoned.—Ed. N. R.]

(*To be continued.*)

* From *New Remedies*, August, 1882.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 2, 1882.

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

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PROPERTIES OF ANTISEPTICS.

THE literary history of antiseptics is a long string of contradictions. Almost without exception the virtues of every substance vaunted as an antiseptic have been challenged; nearly every investigator has had his pet antiseptic which he has "proved" by experiment to be better than any other, and even such a body as carbolic acid has been declared on the one hand to be an energetic germicide, and on the other as only producing unfavourable conditions for the development of germs. Some explanation of this is no doubt to be found in the varying conditions under which experiments have been made by different investigators, as well as in the unwarranted inferences that have been frequently drawn from the results obtained. Some experiments recently made by M. LE BON appear also to show that not only the antiseptic itself, but the condition of the substance upon which it is used, exercises a powerful influence upon the result obtained and has to be taken into consideration. For instance, an aqueous liquor containing one-tenth of its weight of minced flesh gives off at the commencement of putrefaction an odour that is very fetid, but which is destroyed by a relatively small quantity of an antiseptic. If, however, the putrefaction be allowed to go on, after about two months there will be developed in the same liquid new bodies, having a special odour, which requires at least double the quantity of the same antiseptic for its destruction. Again, if the relative power of antiseptics be estimated by taking as a basis their disinfecting properties upon a given weight of such a liquid as that mentioned, it would appear, according to M. LE BON, that amongst the most powerful disinfectants are potassium permanganate, chloride of lime, sulphate of iron acidified by acetic acid, carbolic acid and the glyceroborates of sodium and potassium. He found, for instance, that to disinfect 10 c.c. of the flesh liquid it required 500 c.c. of saturated aqueous solution of salicylic acid, 80 c.c. of a saturated solution of carbolic acid, 80 c.c. of a 10 per cent. solution of glyceroborate of sodium, and only a few drops of a 1 per cent. solution of potassium permanganate. But there is no parallelism between the disinfectant action of an antiseptic and its action upon microbes, for potassium permanganate, which is one of the most powerful disinfectants, was found to exercise no appreciable action upon them, whilst alcohol, which hinders for a long time their development, exercises upon the products of putrefaction only a very slight disinfectant action. There would seem, therefore, to be no relation between the power of preventing the initiation of putrefaction and that of arresting it when it has appeared. Alcohol and carbolic acid, which are preservative agents *par excellence*, have only a very feeble action upon putrefaction that has commenced. In fact, with the exception of a very small number of powerful poisons, such as bichloride of mercury, the greater number of reputed antiseptics have scarcely any action upon bacteria. This is notably the case with carbolic acid, which, curiously enough, M. LE BON considers to be one of the best mediums that can be employed to preserve living bacteria.

Another experiment illustrating the difference that may exist unsuspected in the same substances treated antiseptically at different periods was made by introducing frogs into a flask at the bottom of which was a thin layer of the flesh liquor before mentioned. It was observed that at the commencement of the putrefaction the liquid, although rich in sulphuretted hydrogen, possessing an extremely fetid odour, swarming with bacteria and very virulent when injected under the skin, exercised no appreciable action upon the animals respiring in it; but the same liquid at the end of two months, though no longer possessing virulent properties when injected under the skin, killed in a few minutes the animals who had to breathe in it. There is, therefore, no parallelism between the virulent power of a putrefying body and the toxic power of the volatile compounds that are given off from it; indeed the two properties seem to be inverse the one of the other. M. LE BON reports that the extremely toxic nature of the volatile products of putrefaction were on more than one occasion demonstrated upon himself and other persons who happened to enter his laboratory during the course of his experiments.

The inferences that may be drawn from the results obtained by M. LE BON, as to the circumspection required in estimating the value of antiseptics, are to some extent confirmed by observations recently made by Herr HERZEN upon the varying influence of boracic acid upon different fermentations. He reports that whilst the conversion of starch into glucose by means of the salivary or pancreatic ferment is not influenced by boracic acid, even when the menstruum is a saturated solution, the conversion of glucose into alcohol is favoured by the presence of boracic acid even in very minute quantity. On the other hand only a very small quantity of boracic acid is necessary to completely prevent the conversion of alcohol into acetic acid. In respect also to the fermentations of albuminoid bodies boracic acid shows a marked difference in

its behaviour, the conversion of albumen and fibrin into peptone and tryptone by means of pepsine and trypsine being remarkably accelerated by it, whilst putrefactive fermentation is entirely prevented.

THE INLAND REVENUE REPORT.

The Report of the Commissioners of Her Majesty's Inland Revenue for the year ending the 31st of March last, which has just been issued, contains the usual report of the Principal of the Laboratory. From it we learn that the work under his superintendence has recently very largely increased, the number of samples examined last year having amounted to upwards of 26,000, or an increase of 8000 as compared with the number mentioned in the last report. This increase is attributed principally to the beer duty and to the new regulations for determining the obscuration of foreign spirits on importation. But besides the analyses made in connection more especially with the Customs and Inland Revenue Departments, there is now a large amount of work done in the Laboratory on behalf of other departments of the State, especially in the examination of samples of goods supplied under contract. The necessity for the service thus rendered to the State may be estimated by the fact that, taking the India Office for an example, out of four hundred and eighty-eight general samples submitted, eighty-seven, or 17 per cent. were reported against. Nearly one-half of the samples of wine analysed fell below the standard, and 68 per cent of the samples of brandy, which by the terms of the contract was required to be derived solely from the fermented juice of the grape, had to be rejected as containing variable proportions of grain spirit. The adulteration of oils, too, has been found to have lately become very general, sophistication being effected in more subtle and ingenious ways than formerly. For the Board of Trade eighty-six samples of lime juice and five hundred and fifty samples of lemon juice had been examined, with the result that 6 per cent. of the lime juice and 16 per cent. of the lemon juice (the latter representing more than 14,000 gallons) were rejected. Most of the rejected lemon juice, though otherwise satisfactory, contained free pulpy matter, having been prepared early in the season when lemons are required for making candied peel, and the squeezing is done expeditiously, so that the juice is looked upon rather as a by-product. The pulpy matter has, however, to be got rid of by filtration before the juice is fit for use on shipboard, and as this operation is tedious, attempts are made to get juice containing pulpy matter passed in order to avoid the inconvenience and expense of clarification.

Another duty performed in the Inland Revenue Laboratory is the examination of samples referred by magistrates for analysis under the 22nd section of the Sale of Food and Drugs Act. Of these during the year there were forty-one, consisting of milk, butter, coffee, bread, oatmeal, beer, mustard and whisky, and in fifteen cases the Laboratory officials were unable to support the certificates of the public analysts. Certain samples of milk were received from Dundee, concerning which the prosecutors did not charge the defendants either with adding water or abstracting cream, but asked for a conviction on the ground that the milk was of inferior quality. The total solids in each case were between 11 and 12 per cent., and the proportion of fat, though low, was not lower than is found in genuine milk of poor quality. On receiving a report to this effect the Procurator Fiscal asked for an opinion as to the liability of persons selling milk of low quality, and in reply the Principal of the Laboratory pointed out that the Act of 1875 is silent on the question of standards, from which he inferred that no penalty is incurred by the sale of milk in the state in which it is yielded by a cow in healthy condition under the usual changes of food and season. Another sample of milk was remarkable for the low amount of "solids not fat" and the high amount of mineral matter, especially chlorides, it contained. In this case the cow was reported to be healthy and well fed and to have been milked in the presence of the analyst. Two samples of coffee, which, according to the certificates of the analyst, contained one 10 per cent. and the other 27 per cent. of chicory were found to be quite free from that substance.

The principal report contains one or two points worthy of mention. The licences issued to patent medicine vendors during the year numbered 18,765, and the amount realized for patent medicine stamps reached £144,884, being an increase of £6,205 on the previous year. A falling off in the consumption of beer is connected, among other causes, with the manufacture of temperance drinks, which has been exceedingly brisk. Although some of these contain no alcohol, others are stated to contain a certain amount of spirit generated by fermentation, and it has been found necessary to insist upon the conditions that such drinks shall not be made from malt and hops or contain more than 3 per cent. of proof spirit.

THE BRITISH ASSOCIATION.

The meeting of the British Association at Southampton has been continued during the past week, and on the whole, though not so numerously attended as some meetings in previous years, it has been fairly successful. The difficulty as to the place of meeting next year, caused by the withdrawal of the invitation from Oxford, has been solved by a resolution accepting an invitation from Southport, the President-Elect being Professor Cayley. A vigorous, though unsuccessful effort was made by a section of the members to secure the acceptance of an invitation to the Association to meet next year in the Dominion of Canada, the invitation having the support of the Governor-General and the Premier of the Dominion. It was decided, however, by a considerable majority, that the Association should meet in Montreal in 1884, the other candidates being Birmingham, Aberdeen and Nottingham.

We are requested by the President of the British Pharmaceutical Conference to say that the title of his Address, printed in the last number of this Journal, is "The Relation of Pharmacy to the State."

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

At a special meeting of the Committee, held at the Church Institute, on August 24, 1882, Mr. E. Yewdall, Vice-President, in the chair:

It was resolved, on the motion of Mr. R. Reynolds, seconded by Mr. P. Jefferson:—"That the Committee of the Leeds Chemists' Association record their sorrow at the death of their President, Mr. T. B. Stead, who was a founder of the Association twenty years ago, and who had been one of its constant supporters ever since. Mr. Stead's sound business-like sense, genial manner, and readiness to work for the general good had secured for him the esteem of his fellow chemists. The Committee respectfully tender to Mrs. Stead and her family the assurance of their sympathy under this bereavement."

The Hon. Secretary, Mr. J. Hellowell, was requested to forward to Mrs. Stead a copy of the above resolution, and to enter the same on the minutes of the Association.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 177.)

Additional Delegates who were Present.

We are informed by a correspondent that, in addition to the gentlemen who were mentioned last week as representing various Associations at the Conference, Mr. George Ward, F.C.S., F.I.C., and Mr. F. W. Branson were present as delegates from the Leeds Chemists' Association.

The reading of papers was then proceeded with. The first paper read was the following—

First Report on the Differences between the Essential Oils of Cinnamon and Cassia.

BY A. H. JACKSON, B.SC., PH.C.

This investigation was begun in answer to a question on the Conference Blue List, and the work has been done in the Laboratories of the Owens College, Manchester.

The oils were distilled by Mr. Umney from carefully selected samples of barks:—100 lbs. of the bark of *Cinnamomum Zeylanicum* yielded nearly 8 ounces of the essential oil of cinnamon, and 200 lbs. of the bark, whose source is variously ascribed to the *Cassia lignea*, *Laurus cassia* and *Cinnamomum aromaticum*, yielded nearly 16 ounces of the essential oil of cassia; thus the barks practically yielded ½ per cent. of oil on distillation.

The aim in these experiments was to treat both oils in a similar way, in the hope of separating some product from the one that is either not contained in the other, or is contained in a different proportion, and as a physical examination only involved a very slight consumption of material, the oils were tested from both a physical and a chemical standpoint, although the Conference question only asks for a chemical distinction.

Physical Examination.

Effects on the Senses.—The oils had a pale-brown colour, distinctive and characteristic odours, sweet taste, the cinnamon being more fiery than the cassia.

Effects on Polarized Light.—Gladstone says that oil of cassia has no effect (*Journ. Chem. Soc.*, xvii., 3). The 'Pharmacographia' puts cassia as 0°·1 dextro-rotatory with a column 50 mm. long, and cinnamon as slightly lævo-rotatory; whilst Symes says that cassia has a lævo-rotatory power of 1° and cinnamon none, with a column 100 mm. long.

Relative Densities.—The density was calculated from the formula $\Delta = \frac{m}{w}(Q-\lambda)+\lambda$, where m = the apparent weight in air; Q = density of the water used; λ = density of the air, at the time of weighing, in relation to water at 4° C. as the unit; w = the apparent weight of a volume of water of density; Q equal to the volume of the body. 1st weighings at 17° C.:—Empty flask = 28·466 grams; flask of water = 93·251 grams; water = 64·785 grams; flask of cassia = 95·583 grams; cassia = 67·117 grams; flask of cinnamon = 93·889 grams; cinnamon = 65·423 grams. Therefore, cassia Δ = 1·0346; cinnamon Δ = 1·0086. 2nd weighings at 14° C.:—Empty flask = 28·466 grams; flask of water = 93·257 grams; water = 64·791 grams; flask of cassia = 95·819 grams; cassia = 67·353 grams; flask of cinnamon = 94·013 grams; cinnamon = 65·547 grams. Therefore cassia $\Delta = \frac{67{\cdot}353}{64{\cdot}791}(\cdot 9993-\cdot 0012)+\cdot 0012 = 1{\cdot}0387$; cinnamon $\Delta = \frac{65{\cdot}547}{64{\cdot}791}(\cdot 9993-\cdot 0012)+\cdot 0012 = 1{\cdot}0109$.

The mean of these two determinations fixes the density of cassia at 1·0366, and cinnamon at 1·0097 in vacuo and compared with water at its maximum density.

The published densities vary somewhat. Thus, that of cassia is put as 1·0297 at 15·5° C. (in Watts's Dictionary); as 1·059 at 11° C. (Watts's Supplement); as 1·066 ('Pharmacographia'); as 1·053 at 15·5° C. (Symes); whilst that of cinnamon is put as 1·035 ('Pharmacographia'); as 1·008 at 25° C. (Gmelin's 'Chemistry'); 1·025 at 15·5° C. (Symes).

Their *Absorption Spectra* were tried with negative results.

Refractive Energy.—The angle (ϕ) of an empty, hollow, triangular prism, was determined by observing the distance through which it had to be rotated in order to see a ray of light reflected from both sides of the angle, which measured—1st reading, 57° 58′; 2nd reading, 58° 5′ 10″; mean, 58° 1′ 35″ = ϕ. The prism was then filled with the essential oils, and the minimum deviation (δ) of a ray of *Na* light measured:—

	Direct Reading.	Prism Reading.
1st experiment .	1° 27′ 0″	319° 24′ 20″
2nd ,, .	1° 25′ 20″	319° 25′ 40″
Mean	1° 26′ 10″	319° 25′ 0″

360° − (319° 25′ − 1° 26′ 10″) = 42° 1′ 10″ = δ for cinnamon.

	Direct Reading.	Prism Reading.
1st experiment .	1° 26′ 40″	317° 29′ 0″
2nd ,, .	1° 26′ 0″	317° 28′ 0″
Mean	1° 26′ 20″	317° 28′ 30″

360° − (317° 28′ 30″ − 1° 26′ 20″) = 43° 57′ 50″ = δ for cassia.

The index of refraction (μ) was calculated from the formula $\mu = \frac{\sin \frac{1}{2}(\delta+\phi)}{\sin \frac{1}{2}(\phi)}$.

$$\mu = \frac{\sin \frac{1}{2}(42^\circ\ 1'\ 10'' + 58^\circ\ 1'\ 35'')}{\sin \frac{1}{2}(58^\circ\ 1'\ 35'')} = \frac{\sin 50^\circ\ 1'\ 22\frac{1}{2}''}{\sin 29^\circ\ 0'\ 47\frac{1}{2}''} = \frac{6424811}{4850110} = 1{\cdot}32446 \text{ for cinnamon.}$$

$$\mu = \frac{\sin \frac{1}{2}(43^\circ\ 57'\ 50'' + 58^\circ\ 1'\ 35'')}{\sin \frac{1}{2}(58^\circ\ 1'\ 35'')} = \frac{\sin 50^\circ\ 59'\ 42\frac{1}{2}''}{\sin 29^\circ\ 0'\ 47\frac{1}{2}''} = \frac{6293863}{4850110} = 1{\cdot}29767 \text{ for cassia.}$$

The specific refractive energy was then equal to $\left(\frac{\mu-1}{d}\right)$ where (d) is the density of the oils at 15·5° C., thus cinnamon $= \frac{1{\cdot}32446-1}{1{\cdot}0107} = \cdot 32102$, and cassia $= \frac{1{\cdot}29767-1}{1{\cdot}0377} = \cdot 28685$. This energy is said to be due to the contained cinnamaldehyde.

From these observations it may be inferred that neither the relative densities nor the refractive energies are sufficient guides in distinguishing mixtures of these oils.

Chemical Examination.

These oils consist chiefly of cinnamaldehyde, together with small quantities of cinnamic acid, resins, and unexamined hydrocarbons. The acid and resins are probably due to oxidation of the oil, as they increase in amount with age and exposure. Of the latter, Mulder has examined two, viz., the α-resin, fusible at 60° and soluble in cold alcohol; and the β-resin, fusible at 145°, soluble in hot alcohol, but sparingly so in cold. There is said to be an unexamined camphor in oil of cinnamon, and a stearoptene in oil of cassia ('Pharmacographia'). Rochleder and Hlasiwetz found in oil of cassia a crystalline deposit to which they gave the name of 'benzhydrol,' and the formula $C_{14}H_{15}O_{2\frac{1}{2}}$ (Wurtz's 'Dictionary'). Bizio says that cinnamon becomes turbid at 20° from a deposition of camphor; and Margueron that it freezes several degrees below zero, and then melts at 5° (Gmelin's 'Chemistry,' vol. xiii.). In Gerhardt's edition of Liebig's 'Chemistry,' essence of canelle is said to solidify at – 5°, and to leave crystals at – 20°.

Fractional Distillation.—All temperatures measured with a centigrade thermometer. A portion of the oil of cassia, being neutral but turbid, was added to some fused $CaCl_2$ and ether; then decanted and the ether distilled off, after which the temperature rose to 218° and half the oil came over, leaving a solid black residue. This distillate was separated into six parts by heating in a small retort:—

1st. Distilled under 220°, small portions of a yellow and a light brown liquid which do not mix.

2nd. Distilled about 225°, brown liquid.

3rd. Distilled at 242° to 244°, large portion of brown liquid.

4th. Distilled at 245°, pale yellow, about half the bulk of the brown and more fragrant.

5th. Distilled about 250°, yellowish-brown liquid from which fragrant and acicular crystals separated out after some weeks.

6th. Distilled above 255°, small portion of dark brown liquid. Residue, a brownish-black solid, from which white fumes arose on strongly heating, but nothing more came over.

Bertagnini's Method.—This was thought to be productive of a better result than the method of fractionation. So that a portion of the cassia was shaken, in small quantities at a time, with a saturated solution of potassium bisulphite, whereby a white magma and a small lot of yellowish liquid separated out; this was filtered and washed with methylated spirit by the aid of a Bunsen pump; the residue, on the filter, supposed to be a crystalline mass of cinnamaldehyde and potassium bisulphite was put aside for further investigation. To the filtrate were added water and sodium chloride; a very small quantity of oil separated out and floated on the surface. The supernatant oil, removed by a separating funnel, was treated with fused potassium carbonate to remove water, then dissolved out by anhydrous ether; after evaporation of the ether there was left a clear, brown oil, smelling of sawdust and patchouli (30); a pipette, which had been first tried for the removal of the supernatant oil, was washed with methylated spirit and then with strong sulphuric acid, whereby a brownish-violet colour was developed.

Some of the oil of cinnamon was treated in the same way and with a similar result. Each oil yielded about three times its weight of the washed, damp, fresh, crystalline magma.

Sometimes the oils did not combine with the potassium bisulphite; and at other times so entirely combined as apparently to leave no yellow liquid (as if there was nothing but cinnamaldehyde present); some of the lots liquefied and apparently separated into their original state immediately after combination. These liquefied mixtures of cassia and bisulphite were put into a retort, with some water, and distilled by passing steam through it; a brown residue (1) was left.

To the distillate sodium chloride was added and it was re-distilled; from the opalescent distillates a few drops of a yellow liquid separated, floating on the surface and smelling of oil of bitter almonds.

Residue (1). On boiling, some of this clear, brown, fragrant, thick solution with cupric sulphate and caustic soda, it became yellowish-red and turbid; in a little time it separated into a yellowish-brown liquid and a reddish-brown residue, consisting of red cuprous oxide and an oily substance, which, on addition of water, formed a yellow, turbid solution smelling of benzyaldehyde; therefore No. 1 probably contains a glucoside or glucose.

As it is probable that the cinnamaldehyde is the only constituent of these oils which combines with the potassium bisulphite, it is in the filtrate from their magmas that the cause of difference between the oils is likely to be found. But, as the oils are said to consist almost entirely of the cinnamaldehyde, there is but a very small quantity of material, and that largely diluted, left for the investigation.

The President said pharmacists had long wanted to know something of the differences and the causes of the differences between the oils of cinnamon and of cassia, and the Committee had asked Mr. Jackson to endeavour to throw some light on the subject, and he would now propose a vote of thanks to him for the skill with which he had so far accomplished the work. Mr. Jackson had confirmed what had been previously observed, that the specific gravity of cinnamon oil was considerably below that of cassia, for although the specific gravities had been given very differently by different observers, still taking them all it was clear that the specific gravity of cassia was considerably above that of oil of cinnamon. The numbers Mr. Jackson had quoted were for cassia from 1066 to 1030, and for cinnamon from 1035 to 1008; but he himself found the specific gravity of oil of cassia was 1037, while that of cinnamon was 1010. There seemed to be no great difference in the refractive energy. Finally Mr. Jackson said the chief cause of the difference would unfortunately be found in a material which was present in a very small proportion in both these oils, for each of them consisted largely of cinnamaldehyde. This was unfortunate, because though they were anxious that gentlemen should work at such subjects as this, which required special skill and expensive materials, at the cost of the Conference, still there must be a limit, and if they were to spend £10 or so simply to get from one pound of oil only a very small quantity of the material, which then only *might* contain what caused the difference between the two oils, he feared their funds would be exhausted before they arrived at any very satisfactory conclusion.

The vote of thanks was carried unanimously.

The next paper read was—

On the Alkaloidal Value of Belladonna Plants at Different Periods of Growth.

BY A. W. GERRARD, F.C.S.

At last year's meeting of this Conference I presented my first report on belladonna, the main features of which demonstrated the relative atropine value of cultivated and wild plants. The wild variety was found to be richest in atropine, and, contrary to general opinion, the leaf in both varieties was found to be richer than the root.

In continuation, I have been able to examine this summer two specimens of the first year's growth of the plant; likewise the second year's growth at three periods of development, viz., before, during, and after flowering. The object as regards the second year's plant was to determine at what period it attains its maximum therapeutic value.

Immediately on receipt of the fresh plants, the leaves and roots were separated and well dried, the estimation of

the atropine being completed in less than a month from the time of collection. This rapidity of manipulation was considered advisable, to avoid as much as possible the changes plants undergo by keeping.

In the present experiments the process by which the atropine has been estimated differs from that described in my first report, the method of extraction, however, has been the same; the difference is that I have employed a volumetric instead of a gravimetric method.

For this purpose, I titrate the ethereal alkaloidal residue with a centinormal sulphuric acid, 100 parts of which is made to exactly neutralize 1 part of pure atropine. The alkaloid residue being but sparingly soluble in water I dissolve it in alcohol and colour with litmus, so as to clearly indicate the critical point. This method I find both rapid and accurate; to test it, two samples of commercial atropine, and two made by myself from cultivated and wild plants, gave upon titration, figures agreeing within 1 per cent. This result, whilst demonstrating the accuracy of the method, also shows that commercial atropine is a very pure substance.

The first year's plants examined were both uncultivated, one grown in Yorkshire on a chalk soil, the other in Sussex in leaf mould; none of these plants appeared to have flowered, they averaged 6 inches in height and twenty of them yielded on drying 203 grains of leaf and 165 grains of root. These two varieties gave the following results:—

Atropine in 100 *parts Wild Belladonna, First Year's Growth.*

	Roots.	Leaves.
From chalk soil . . .	·21	·23
From leaf mould . . .	·09	·22

The only value of this experiment is to show that the plant in the first year of its growth contains about half the quantity of atropine present in older plants, and practically this is of little importance, as on account of its small growth it is never collected for the druggist's use. The result also helps to confirm what I have stated in my previous paper, viz., that a chalky soil favours the formation of atropine.

Examination of Second Year's Plant.

The cultivated kind only was subjected to analysis. It was grown by Mr. Ransom, of Hitchin, and gathered in the months of May, June and July, June being the month when it is usually collected for the druggist's use, and would be expected to have arrived at maturity. The plants I received averaged 3 feet in height. The May plant, though not fully developed, had the most luxuriant crop of leaves. On the June plants the flowers were abundant, but the leaves were small. The July plant was covered with unripe fruits and small leaves.

Atropine in 100 *parts Cultivated Belladonna, Second Year's Growth.*

When collected.	Leaves.	Roots.
May	·25	·21
June	·36	·32
July	·34	·32

This result shows that the plant before flowering is not rich in active principles, but it appears that at the period of flowering the full development is reached and maintained into the fruiting season. Especially worthy of attention is the increase in the June yield of atropine, it being one-third more than obtained from the May plant. The experiment also shows a simultaneous development of root and leaf, and not the exhaustion of the former to strengthen the latter. The inference from this is that root and leaf should be gathered at the same period.

Throughout these experiments, as on former occasions, the leaves have uniformly yielded more atropine than the roots.

The President said this was a strictly pharmaceutical report, and considering the powerful effect of such alkaloids as atropine on the human system any researches on such bodies was of extreme importance. He gathered that in speaking of atropine Mr. Gerrard alluded to what he defined last year rather as a double alkaloid, as he said he would not tie himself to the statement that the alkaloid he obtained was chemically pure atropine.

Mr. Gerrard said he used the term atropine in the general sense, as usually accepted.

Mr. Naylor asked if these results were to be considered as commensurate with those obtained last year, because one would rather suppose, inasmuch as he had employed a different method for estimating the total alkaloid, there would be some slight deviation. The process of manipulation was very much shortened and therefore it was probable that by the former process there would be a greater amount of loss.

Mr. Ekin said this was of course only a preliminary report, and as he understood that Mr. Gerrard was going to continue the subject he would ask him if he thought it worth while to examine further the accuracy of the sulphuric acid determination. It certainly had the merit of extreme simplicity, but it might be worth further investigation as to whether it really did indicate the amount of alkaloid. Mr. Gerrard had told them that what he understood by the name alkaloid, as generally received, was a mixture, and that of itself introduced a little uncertainty, but this would be much increased if there were any doubt thrown on the method of determination. In such a very delicate operation the indications of litmus would be hardly sufficiently delicate. He would suggest to Mr. Gerrard, if he continued this method of estimating the alkaloids, whether he would not find methyl orange or some similar body give much narrower indications than were possible with litmus. He hoped they would be careful in drawing deductions as to the difference in quality of plants grown on cultivated soil and in their natural state from so comparatively small a number of experiments.

Mr. Martindale asked if the volumetric test by sulphuric acid would not reckon the uncrystallizable alkaloid as well as the crystallizable atropine, and thus lead to error. Some manufacturers found that a great deal of uncrystallizable alkaloid was produced.

Mr. Plowman would be glad if Mr. Gerrard would explain exactly what he meant by saying that he used a centinormal solution, 100 parts of which would exactly neutralize 1 part of pure atropine. With reference to Mr. Naylor's remarks, it was only fair to notice that the gravimetric operation would hardly be practicable for estimating an amount of atropine such as was described by Mr. Gerrard last year. Some modification must be adopted in order to get any results at all.

Mr. Holmes said it was interesting to note the statement that belladonna grown on chalky soil yielded more alkaloid than that grown on other soil. He had seen the plant growing on calcareous and on non-calcareous soil, and he had found that when growing on chalky or calcareous soil it was far more luxuriant, which might account for the presence of more alkaloid.

A vote of thanks having been passed to Mr. Gerrard for his paper,

Mr. Gerrard, in reply, said he spoke of the total alkaloids because there was some uncertainty whether the product obtained was one definite substance or not. There was this difference between the process now employed and the one he adopted last year, that there was not so much mechanical loss involved in the present process, because there were not so many operations in it. In working out long processes, involving several precipitations and recrystallizations, there must be a mechanical loss, and therefore the percentages now given would be somewhat higher than those given before. Nevertheless, they were not very much so. The process he followed before was to obtain the alkaloid in as pure a state as possible, and to weigh it as alkaloid, and to do that, he ensured the thorough exhaustion of the mother-

liquor of atropine, endeavouring, as far as possible to avoid mechanical loss. In reply to Mr. Ekin, who doubted whether the residue he obtained would be all alkaloid, he might say that the residue was not all alkaloid, but it was not all neutralized by sulphuric acid. All which was neutralized by the sulphuric acid he assumed to be alkaloid, and he believed it to be nothing else; because when ammonia was used to treat an extractive substance it liberated merely alkaloidal hydrates, and the sulphuric acid simply took them out together with colouring matters and some resins; but these latter would not neutralize sulphuric acid, therefore, he had a right to assume that what the sulphuric acid neutralized was alkaloid. Mr. Martindale had spoken of uncrystallizable substances, not atropine, in the alkaloidal residue. He had worked a good deal with alkaloids and on atropine, and he had always found what was usually called the uncrystallizable residue by further manipulation to be capable of crystallization, and if the sulphuric acid solution of his alkaloid was again precipitated the alkaloid could be easily extracted by pure ether in a crystalline state.

An adjournment for luncheon then took place.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The President's Address.

(*Concluded from page* 179.)

Electricity is the form of energy best suited for transmitting an effect from one place to another; the electric current passes through certain substances, the metals, with a velocity limited only by the retarding influence caused by electric charge of the surrounding dielectric, but approaching probably under favourable conditions that of radiant heat and light, or 300,000 kilometres per second; it refuses, however, to pass through oxidized substances, glass, gums, or through gases except when in a highly rarefied condition. It is easy, therefore, to confine the electric current within bounds, and to direct it through narrow channels of extraordinary length. The conducting wire of an Atlantic cable is such a narrow channel; it consists of a copper wire, or strand of wires, 5 mm. in diameter, by nearly 5000 kilometres in length, confined electrically by a coating of guttapercha about 4 mm. in thickness. The electricity from a small galvanic battery passing through this channel prefers the long journey to America in the good conductor, and back through the earth, to the shorter journey across the 4 mm. in thickness of insulating material. By an improved arrangement the alternating currents employed to work long submarine cables do not actually complete the circuit, but are merged in a condenser at the receiving station after having produced their extremely slight but certain effect upon the receiving instrument. So perfect is the channel and so precise the action of both the transmitting and receiving instruments employed, that two systems of electric signals may be passed simultaneously through the same cable in opposite directions, producing independent records at either end. By the application of this duplex mode of working to the Direct United States cable under the superintendence of Dr. Muirhead, its transmitting power was increased from twenty-five to sixty words a minute, being equivalent to about twelve currents or primary impulses per second.

The minute currents here employed are far surpassed as regards delicacy and frequency by those revealed to us by that marvel of the present day, the telephone. The electric currents caused by the vibrations of a diaphragm acted upon by the human voice, naturally vary in frequency and intensity according to the number and degree of those vibrations, and each motor current, in exciting the electro-magnet forming part of the receiving instrument, deflects the iron diaphragm occupying the position of an armature to a greater or smaller extent according to its strength. Savart found that the fundamental *la* springs from 440 complete variations in a second, but what must be the frequency and modulations of the motor current and of magnetic vibrations necessary to convey to the ear, through the medium of a vibrating armature, such a complex of human voices and of musical instruments as constitutes an opera performance. And yet such performances could be distinctly heard and even enjoyed as an artistic treat by applying to the ears a pair of the double telephonic receivers at the Paris Electrical Exhibition, when connected with a pair of transmitting instruments in front of the footlights of the Grand Opera. In connection with the telephone, and with its equally remarkable adjunct, the microphone, the names of Riess, Graham Bell, Edison and Hughes will ever be remembered.

Regarding the transmission of power to a distance the electric current has now entered the lists in competition with compressed air, the hydraulic accumulator, and the quick running rope as used at Schaffhausen to utilize the power of the Rhine fall. The transformation of electrical into mechanical energy can be accomplished with no further loss than is due to such incidental causes as friction and the heating of wires; these in a properly designed dynamo-electric machine do not exceed 10 per cent., as shown by Dr. John Hopkinson, and, judging from recent experiments of my own, a still nearer approach to ultimate perfection is attainable. Adhering, however, to Dr. Hopkinson's determination for safety's sake, and assuming the same percentage in reconverting the current into mechanical effect, a total loss of 19 per cent. results. To this loss must be added that through electrical resistance in the connecting line wires, which depends upon their length and conductivity, and that due to heating by friction of the working parts of the machine. Taking these as being equal to the internal losses incurred in the double process of conversion, there remains a useful effect of $100 - 38 = 62$ per cent., attainable at a distance, which agrees with experimental results, although in actual practice it would not be safe at present to expect more than 50 per cent. of ultimate useful effect, to allow for all mechanical losses.

In using compressed air or water for the transmission of power the loss cannot be taken at less than 50 per cent., and as it depends upon fluid resistance it increases with distance more rapidly than in the case of electricity. Taking the loss of effect in all cases as 50 per cent., electric transmission presents the advantage that an insulated wire does the work of a pipe capable of withstanding high internal pressure, which latter must be more costly to put down and to maintain. A second metallic conductor is required, however, to complete the electrical circuit, as the conducting power of the earth alone is found unreliable for passing quantity currents, owing to the effects of polarization; but as this second conductor need not be insulated, water or gas pipes, railway metals or fencing wire, may be called into requisition for the purpose. The small space occupied by the electro-motor, its high working speed, and the absence of waste products, render it specially available for the general distribution of power to cranes and light machinery of every description. A loss of effect of 50 per cent. does not stand in the way of such applications, for it must be remembered that a powerful central engine of best construction produces motive power with a consumption of two pounds of coal per horse-power per hour, whereas small engines distributed over a district would consume not less than five; we thus see that there is an advantage in favour of electric transmission as regards fuel, independently of the saving of labour and other collateral benefits.

To agriculture, electric transmission of power seems well adapted for effecting the various operations of the farm and fields from one centre. Having worked such a system myself in combination with electric lighting and horticulture for upwards of two years, I can speak with

confidence of its economy, and of the facility with which the work is accomplished in charge of untrained persons.

As regards the effect of the electric light upon vegetation there is little to add to what was stated in my paper read before Section A last year, and ordered to be printed with the report, except that in experimenting upon wheat, barley, oats, and other cereals sown in the open air, there was a marked difference between the growth of the plants influenced and those uninfluenced by the electric light. This was not very apparent till towards the end of February, when, with the first appearance of mild weather, the plants under the influence of an electric lamp of 4000 candle power placed about 5 metres above the surface, developed with extreme rapidity, so that by the end of May they stood above 4 feet high, with the ears in full bloom, when those not under its influence were under 2 feet in height, and showed no sign of the ear.

In the electric railway first constructed by Dr. Werner Siemens, at Berlin, in 1879, electric energy was transmitted to the moving carriage or train of carriages through the two rails upon which it moved, these being sufficiently insulated from each other by being placed upon well creosoted cross sleepers. At the Paris Electrical Exhibition the current was conveyed through two separate conductors making sliding or rolling contact with the carriage, whereas in the electric railway now in course of construction in the north of Ireland (which when completed will have a length of twelve miles) a separate conductor will be provided by the side of the railway, and the return circuit completed through the rails themselves, which in that case need not be insulated; secondary batteries will be used to store the surplus energy created in running downhill, to be restored in ascending steep inclines, and for passing roadways where the separate insulated conductor is not practicable. The electric railway possesses great advantage over horse or steam-power for towns, in tunnels, and in all cases where natural sources of energy, such as waterfalls, are available; but it would not be reasonable to suppose that it will in its present condition compete with steam propulsion upon ordinary railways.

The deposition of metals from their solutions is perhaps the oldest of all useful applications of the electric current, but it is only in very recent times that the dynamo current has been practically applied to the refining of copper and other metals, as now practised at Birmingham and elsewhere, and upon an exceptionally large scale at Ocker, in Germany. The dynamo machine there employed was exhibited at the Paris Electrical Exhibition, its peculiar feature being that the conductors upon the rotating armature consisted of solid bars of copper 30 mm. square, in section, which were found only just sufficient to transmit the large quantity of electricity of low tension necessary for this operation. One such machine consuming 4-horse-power deposits about 300 kilograms of copper per twenty-four hours; the motive power at Ocker is derived from a waterfall.

Electric energy may also be employed for heating purposes, but in this case it would obviously be impossible for it to compete in point of economy with the direct combustion of fuel for the attainment of ordinary degrees of heat. Bunsen and Ste.-Claire Deville have taught us, however, that combustion becomes extremely sluggish when a temperature of 1800° C. has been reached, and for effects at temperatures exceeding that limit the electric furnace will probably find advantageous applications. Its specific advantage consists in being apparently unlimited in the degree of heat attainable, thus opening out a new field of investigation to the chemist and metallurgist. Tungsten has been melted in such a furnace, and 8 pounds of platinum have been reduced from the cold to the liquid condition in twenty minutes.

The largest and most extensive application of electric energy at the present time is to lighting, but, considering how much has of late been said and written for and against this new illuminant, I shall here confine myself to a few general remarks. Joule has shown that if an electric current is passed through a conductor the whole of the energy lost by the current is converted into heat; or if the resistance be localized, into radiant energy comprising heat, light, and actinic rays. Neither the low heat rays nor the ultra-violet of highest refrangibility affect the retina, and may be regarded as lost energy, the effective rays being those between the red and violet of the spectrum, which in their combination produce the effect of white light.

Regarding the proportion of luminous to non-luminous rays proceeding from an electric arc or incandescent wire, we have a most valuable investigation by Dr. Tyndall, recorded in his work on 'Radiant Heat.' Dr. Tyndall shows that the luminous rays from a platinum wire heated to its highest point of incandescence, which may be taken at 1700° C., formed $\frac{1}{24}$th part of the total radiant energy emitted, and $\frac{1}{10}$th part in the case of an arc light worked by a battery of fifty Grove's elements. In order to apply these valuable data to the case of electric lighting by means of dynamo currents, it is necessary in the first place to determine what is the power of fifty Grove's elements of the size used by Dr. Tyndall, expressed in the practical scale of units as now established. From a few experiments lately undertaken for myself, it would appear that fifty such cells have an electromotive force of 98·5 volts, and an internal resistance of 13·5 ohms, giving a current of 7·3 ampères when the cells are short-circuited. The resistance of a regulator such as Dr. Tyndall used in his experiments may be taken at 10 ohms, the current produced in the arc would be 4 ampères (allowing 1 ohm for the leads), and the power consumed 160 watts; the light power of such an arc would be about 150 candles, and comparing this with an arc of 3308 candles produced by 1162 watts, we find that 7·3 times the electric energy produce 22 times the amount of light measured horizontally. If, therefore, in Dr. Tyndall's arc $\frac{1}{10}$th of the radiant energy emitted was visible as light, it follows that in a powerful arc of 3300 candles, fully one-third are luminous rays. In the case of the incandescence light (say a Swan light of 20 candle power) we find in practice that nine times as much power has to be expended as in the case of the arc light; hence $\frac{1}{27}$th part of the power is given out as luminous rays, as against $\frac{1}{24}$th in Dr. Tyndall's incandescent platinum—a result sufficiently approximate considering the wide difference of conditions under which the two are compared.

These results are not only of obvious practical value, but they seem to establish a fixed relation between current, temperature, and light produced, which may serve as a means to determine temperatures exceeding the melting point of platinum with greater accuracy than has hitherto been possible by actinimetric methods in which the thickness of the luminous atmosphere must necessarily exercise a disturbing influence. It is probably owing to this circumstance that the temperature of the electric arc, as well as that of the solar photosphere, has frequently been greatly over-estimated.

The principal argument in favour of the electric light is furnished by its immunity from products of combustion, which not only heat the lighted apartments, but substitute carbonic acid and deleterious sulphur compounds for the oxygen upon which respiration depends; the electric light is white instead of yellow, and thus enables us to see pictures, furniture and flowers as by daylight; it supports growing plants instead of poisoning them, and by its means we can carry on photography and many other industries at night as well as during the day. The objection frequently urged against the electric light, that it depends upon the continuous motion of steam or gas engines, which are liable to accidental stoppage, has been removed by the introduction into practical use of the secondary battery; this, although

not embodying a new conception, has lately been greatly improved in power and constancy by Planté, Faure, Volckmar, Sellon, and others, and promises to accomplish for electricity what the gas-holder has done for the supply of gas and the accumulator for hydraulic transmission of power.

It can no longer be a matter of reasonable doubt, therefore, that electric lighting will take its place as a public illuminant, and that even though its cost should be found greater than that of gas, it will be preferred for the lighting of drawing-rooms and dining-rooms, theatres and concert-rooms, museums, churches, warehouses, show-rooms, printing establishments and factories, and also the cabins and engine-rooms of passenger steamers. In the cheaper and more powerful form of the arc light, it has proved itself superior to any other illuminant for spreading artificial daylight over the large areas of harbours, railway stations, and the sites of public works. When placed within a holophote the electric lamp has already become a powerful auxiliary in effecting military operations both by sea and land.

The electric light may be worked by natural sources of power such as waterfalls, the tidal wave, or the wind, and it is conceivable that these may be utilized at considerable distances by means of metallic conductors. Some five years ago I called attention to the vastness of those sources of energy, and the facility offered by electrical conduction in rendering them available for lighting and power-supply, while Sir William Thomson made this important matter the subject of his admirable address to Section A last year at York, and dealt with it in an exhaustive manner.

The advantages of the electric light and of the distribution of power by electricity have lately been recognized by the British Government, who have just passed a Bill through Parliament to facilitate the establishment of electrical conductors in towns, subject to certain regulating clauses to protect the interests of the public and of local authorities. Assuming the cost of electric light to be practically the same as gas, the preference for one or other will in each application be decided upon grounds of relative convenience, but I venture to think that gas-lighting will hold its own as the poor man's friend.

Gas is an institution of the utmost value to the artizan; it requires hardly any attention, is supplied upon regulated terms, and gives with what should be a cheerful light a genial warmth, which often saves the lighting of a fire. The time is moreover not far distant, I venture to think, when both rich and poor will largely resort to gas as the most convenient, the cleanest, and the cheapest of heating agents, and when raw coal will be seen only at the colliery or the gasworks. In all cases where the town to be supplied is within say thirty miles of the colliery, the gasworks may with advantage be planted at the mouth, or still better at the bottom of the pit, whereby all haulage of fuel would be avoided, and the gas, in its ascent from the bottom of the colliery, would acquire an onward pressure sufficient probably to impel it to its destination. The possibility of transporting combustible gas through pipes for such a distance has been proved at Pittsburg, where natural gas from the oil district is used in large quantities.

The quasi monopoly so long enjoyed by gas companies has had the inevitable effect of checking progress. The gas being supplied by meter, it has been seemingly to the advantage of the companies to give merely the prescribed illuminating power, and to discourage the invention of economical burners, in order that the consumption might reach a maximum. The application of gas for heating purposes has not been encouraged, and is still made difficult in consequence of the objectionable practice of reducing the pressure in the mains during daytime to the lowest possible point consistent with prevention of atmospheric indraught. The introduction of the electric light has convinced gas managers and directors that such a policy is no longer tenable, but must give way to one of technical progress; new processes for cheapening the production and increasing the purity and illuminating power of gas are being fully discussed before the Gas Institute; and improved burners, rivalling the electric light in brilliancy, greet our eyes as we pass along our principal thoroughfares.

Regarding the importance of the gas supply as it exists at present, we find from a Government return that the capital invested in gasworks in England, other than those of local authorities, amounts to £30,000,000; in these 4,281,048 tons of coal are converted annually, producing 43,000,000,000 cubic feet of gas, and about 2,800,000 tons of coke; whereas the total amount of coal annually converted in the United Kingdom may be estimated at 9,000,000 tons, and the by-products therefrom at 500,000 tons of tar, 1,000,000 tons of ammonia liquor, and 4,000,000 tons of coke, according to the returns kindly furnished me by the managers of many of the gasworks and corporations. To these may be added say 120,000 tons of sulphur, which up to the present time is a waste product.

Previous to the year 1856—that is to say, before Mr. W. H. Perkin had invented his practical process, based chiefly upon the theoretical investigations of Hoffman, regarding the coal-tar bases and the chemical constitution of indigo—the value of coal-tar in London was scarcely a halfpenny a gallon, and in country places gas-makers were glad to give it away. Up to that time the coal-tar industry had consisted chiefly in separating the tar by distillation into naphtha, creosote, oils, and pitch. A few distillers, however, made small quantities of benzene, which had been first shown—by Mansfield, in 1849—to exist in coal-tar naphtha mixed with toluene, cumene, etc. The discovery, in 1856, of the mauve or aniline purple gave a great impetus to the coal-tar trade, inasmuch as it necessitated the separation of large quantities of benzene, or a mixture of benzene and toluene, from the naphtha. The trade was further increased by the discovery of the magenta or rosaniline dye, which required the same products for its preparation. In the meantime, carbolic acid was gradually introduced into commerce, chiefly as a disinfectant, but also for the production of colouring matter.

The colour industry utilizes even now practically all the benzene, a large proportion of the solvent naphtha, all the anthracene, and a portion of the naphthalene resulting from the distillation of coal-tar; and the value of the colouring matter thus produced is estimated by Mr. Perkin at £3,350,000.

The demand for ammonia may be taken as unlimited, on account of its high agricultural value as a manure; and, considering the failing supply of guano and the growing necessity for stimulating the fertility of our soil, an increased production of ammonia may be regarded as a matter of national importance, for the supply of which we have to look almost exclusively to our gasworks. The present production of 1,000,000 tons of liquor yields 95,000 tons of sulphate of ammonia; which, taken at £20 10*s.* a ton, represents an annual value of £1,947,000.

The total annual value of the gasworks by-products may be estimated as follows:—

Colouring matter	£3,350,000
Sulphate of ammonia	1,947,000
Pitch (325,000 tons)	365,000
Creosote (25,000,000 gallons) . .	208,000
Crude carbolic acid (1,000,000 gallons)	100,000
Gas coke, 4,000,000 tons (after allowing 2,000,000 tons consumption in working the retorts) at 12*s.*	2,400,000
Total . . .	£8,370,000

Taking the coal used, 9,000,000 tons, at 12*s.*, equal

£5,400,000; it follows that the by-products exceed in value the coal used by very nearly £3,000,000.

In using raw coal for heating purposes these valuable products are not only absolutely lost to us, but in their stead we are favoured with those semi-gaseous by-products of the atmosphere too well known to the denizens in London and other large towns as smoke. Professor Roberts has calculated that the soot in the pall hanging over London on a winter's day amounts to fifty tons, and that the carbonic oxide, a poisonous compound, resulting from the imperfect combustion of coal, may be taken as at least five times that amount. Mr. Aitken has shown, moreover, in an interesting paper communicated to the Royal Society of Edinburgh, last year, that the fine dust resulting from imperfect combustion of coal is mainly instrumental in the formation of fog; each particle of solid matter attracting to itself aqueous vapour; these globules of fog are rendered particularly tenacious and disagreeable by the presence of tar vapour, another result of imperfect combustion of raw fuel, which might be turned to much better account at the dye-works. The hurtful influence of smoke upon public health, the great personal discomfort to which it gives rise, and the vast expense it indirectly causes through the destruction of our monuments, pictures, furniture, and apparel, are now being recognized, as is evinced by the success of recent Smoke Abatement Exhibitions. The most effectual remedy would result from a general recognition of the fact that wherever smoke is produced, fuel is being consumed wastefully, and that all our calorific effects, from the largest down to the domestic fire, can be realized as completely and more economically, without allowing any of the fuel employed to reach the atmosphere unburnt. This most desirable result may be effected by the use of gas for all heating purposes with or without the addition of coke or anthracite.

The cheapest form of gas is that obtained through the entire distillation of fuel in such gas producers as are now largely used in working the furnaces of glass, iron, and steel works; but gas of this description would not be available for the supply of towns owing to its bulk, about two-thirds of its volume being nitrogen. The use of water-gas, resulting from the decomposition of steam passing through a hot chamber filled with coke, has been suggested, but this gas is also objectionable, because it contains, besides hydrogen, the poisonous and inodorous gas carbonic oxide, the introduction of which into dwelling-houses could not be effected without considerable danger. A more satisfactory mode of supplying heating separately from illuminating gas would consist in connecting the retort at different periods of the distillation with two separate systems of mains for the delivery of the respective gases. By resorting to improved means of heating the retorts with gaseous fuel, such as have been in use at the Paris gasworks for a considerable number of years, the length of time for effecting each distillation may be shortened from six hours, the usual period in former years, to four, or even three hours, as now practised at Glasgow and elsewhere. By this means a given number of retorts can be made to produce, in addition to the former quantity of illuminating gas of superior quality, a similar quantity of heating gas, resulting in a diminished cost of production and an increased supply of the valuable by-products previously referred to.

The greater efficiency of gas as a fuel results chiefly from the circumstance that a pound of gas yields in combustion 22,000 heat units, or exactly double the heat produced in the combustion of a pound of ordinary coal. This extra heating power is due partly to the freedom of the gas from earthy constituents, but chiefly to the heat imparted to it in effecting its distillation. Recent experiments with gas-burners have shown that in this direction also there is much room for improvement.

The amount of light given out by a gas flame depends upon the temperature to which the particles of solid carbon in the flame are raised, and Dr. Tyndall has shown that of the radiant energy set up in such a flame, only the $\frac{1}{25}$th part is luminous; the hot products of combustion carry off at least four times as much energy as is radiated, so that not more than one hundredth part of the heat evolved in combustion is converted into light. This proportion could be improved, however, by increasing the temperature of combustion, which may be effected either by intensified air currents or by regenerative action. Supposing that the heat of the products of combustion could be communicated to metallic surfaces, and be transferred by conduction or otherwise to the atmospheric air supporting combustion in the flame, we should be able to increase the temperature accumulatively to any point within the limit of dissociation; this limit may be fixed at about 2300° C., and cannot be very much below that of the electric arc. At such a temperature the proportion of luminous rays to the total heat produced in combustion would be more than doubled, and the brilliancy of the light would at the same time be greatly increased. Thus improved, gas-lighting may continue its rivalry with electric lighting both as regards economy and brilliancy, and such rivalry must necessarily result in great public advantage.

In the production of mechanical effect from heat, gaseous fuel also presents most striking advantages, as will appear from the following consideration. When we have to deal with the question of converting mechanical into electrical effect, or *vice versâ*, by means of the dynamo-electrical machine, we have only to consider what are the equivalent values of the two forms of energy, and what precautions are necessary to avoid losses by the electrical resistance of conductors and by friction. The transformation of mechanical effect into heat involves no losses except those resulting from imperfect installation, and these may be so completely avoided that Dr. Joule was able by this method to determine the equivalent values of the two forms of energy. But in attempting the inverse operation of effecting the conversion of heat into mechanical energy we find ourselves confronted by the second law of thermodynamics, which says that whenever a given amount of heat is converted into mechanical effect another but variable amount descends from a higher to a lower potential, and is thus rendered unavailable.

In the condensing steam-engine this waste heat comprises that communicated to the condensing water, whilst the useful heat, or that converted into mechanical effect, depends upon the difference of temperature between the boiler and condenser. The boiler pressure is limited, however, by considerations of safety and convenience of construction, and the range of working temperature rarely exceeds 120° C., except in the engines constructed by Mr. Perkins, in which a range of 160° C., or an expansive action commencing at fourteen atmospheres, has been adopted with considerable promise of success, as appears from an able report on this engine by Sir Frederick Bramwell. To obtain more advantageous primary conditions we have to turn to the caloric or gas-engine, because in them the coefficient of efficiency expressed by $\frac{T-T'}{T}$, may be greatly increased. This value would reach a maximum if the initial absolute temperature T could be raised to that of combustion, and T′ reduced to atmospheric temperature, and these maximum limits can be much more nearly approached in the gas-engine worked by a combustible mixture of air and hydrocarbons than in the steam-engine.

Before many years have elapsed we shall find in our factories and on board our ships engines with a fuel consumption not exceeding one pound of coal per effective horse-power per hour, in which the gas producer takes the place of the somewhat complex and dangerous steam boiler. The advent of such an engine and of the dynamo-machine must mark a new era of material progress at least equal to that produced by the introduction of steam

power in the early part of our century. Let us consider what would be the probable effect of such an engine upon that most important interest of this country—the merchant navy.

According to returns kindly furnished me by the Board of Trade and 'Lloyd's Register of Shipping,' the total value of the merchant shipping of the United Kingdom may be estimated at £126,000,000, of which £90,000,000 represent steamers having a net tonnage of 3,003,988 tons; and £36,000,000 sailing vessels, of 3,688,008 tons. The safety of this vast amount of shipping, carrying about five-sevenths of our total imports and exports, or £500,000,000 of goods in the year, and of the more precious lives connected with it, is a question of paramount importance. It involves considerations of the most varied kind: comprising the construction of the vessel itself, and the material employed in building it; its furniture of engines, pumps, sails, tackle, compass, sextant, and sounding apparatus, the preparation of reliable charts for the guidance of the navigator, and the construction of harbours of refuge, lighthouses, beacons, bells, and buoys, for channel navigation. Yet notwithstanding the combined efforts of science, inventive skill, and practical experience—the accumulation of centuries—we are startled with statements to the effect that during last year as many as 1007 British-owned ships were lost, of which fully two-thirds were wrecked upon our shores, representing a total value of nearly £10,000,000. Of these ships 870 were sailing vessels and 137 steamers, the loss of the latter being in a fourth of the cases attributable to collision. The number of sailing vessels included in these returns being 19,325, and of steamers 5505, it appears that the steamer is the safer vessel, in the proportion of 4·43 to 3·46; but the steamer makes on an average three voyages for one of the sailing ship taken over the year, which reduces the relative risk of the steamer as compared with the sailing ship per voyage in the proportion of 13·29 to 3·46. Commercially speaking, this factor of safety in favour of steam-shipping is to a great extent counterbalanced by the value of the steam-ship, which bears to that of the sailing vessel per net carrying ton the proportion of 3 : 1, thus reducing the ratio in favour of steam-shipping as 13·29 to 10·38, or in round numbers as 4 : 3.

In considering the question how the advantages thus established in favour of steam-shipping could be further improved, attention should be called in the first place to the material employed in their construction, A new material was introduced for this purpose by the Admiralty in 1876–78, when they constructed at Pembroke dockyard the two steam corvettes, the *Iris* and *Mercury*, of mild steel. The peculiar qualities of this material are such as to have enabled shipbuilders to save 20 per cent. in the weight of the ship's hull, and to increase to that extent its carrying capacity. It combines with a strength 30 per cent. superior to that of iron such extreme toughness that in the case of collision the side of the vessel has been found to yield or bulge several feet without showing any signs of rupture, a quality affecting the question of sea risk very favourably. When to the use of this material there are added the advantages derived from a double bottom, and from the division of the ship's hold by means of bulkheads of solid construction, it is difficult to conceive how such a vessel could perish by collision either with another vessel or with a sunken rock. The spaces between the two bottoms are not lost, because they form convenient chambers for water ballast, but powerful pumps should in all cases be added to meet emergencies.

If to the improvements already achieved could be added an engine of half the weight of the present steam engine and boilers, and working with only half the present expenditure of fuel, a further addition of 30 per cent. could be made to the cargo of an Atlantic propeller vessel—no longer to be called a steamer—and the balance of advantages in favour of such vessels would be sufficient to restrict the use of sailing craft chiefly to the regattas of this and neighbouring ports.

The admirable work on the 'British Navy,' lately published by Sir Thomas Brassey, the Civil Chief Lord of the Admiralty, shows that the naval department of this country is fully alive to all improvements having regard to the safety as well as to the fighting qualities of Her Majesty's ships of war, and recent experience goes far to prove that although high speed and manœuvring qualities are of the utmost value, the armour plate which appeared to be fast sinking in public favour is not without its value in actual warfare.

The progressive views perceptible in the construction of the navy are further evidenced in a remarkable degree in the hydrographic department. Captain Sir Frederick Evans, the hydrographer, and Vice-President of the British Association, gave us at York last year a very interesting account of the progress made in that department, which, while dealing chiefly with the preparation of charts showing the depth of water, the direction and force of currents, and the rise of tides near our shores, contains also valuable statistical information regarding the more general questions of the physical conditions of the sea, its temperature at various depths, its flora and fauna, as also the rainfall and the nature and force of prevailing winds. In connection with this subject the American Naval Department has taken an important part, under the guidance of Captain Maury and the Agassiz father and son, whilst in this country the persistent labours of Dr. William Carpenter deserve the highest consideration.

Our knowledge of tidal action has received a most powerful impulse through the invention of a self-recording gauge and tide predicter, which will form the subject of one of the discourses to be delivered at our present meeting by its principal originator, Sir William Thomson.

The application of iron and steel in naval construction rendered the use of the compass for some time illusory, but in 1839 Sir George Airy showed how the errors of the compass, due to the influence experienced from the iron of the ship, may be perfectly corrected by magnets and soft iron placed in the neighbourhood of the binnacle, but the great size of the needles in the ordinary compasses rendered the correction of the quadrantal errors practically unattainable. In 1876, Sir William Thomson invented a compass with much smaller needles than those previously used, which allows Sir George Airy's principles to be applied completely.

Sir William Thomson has also enriched the art of navigation by the invention of two sounding machines; the one being devised for ascertaining great depths very accurately in less than one-quarter the time formerly necessary, and the other for taking depths up to 130 fathoms without stopping the ship in its onward course. In both these instruments steel pianoforte wire is used instead of the hempen and silken lines formerly employed; in the latter machine the record of depth is obtained not by the quantity of wire run over its counter and brake wheel, but through the indications produced upon a simple pressure gauge consisting of an inverted glass tube, whose internal surface is covered beforehand with a preparation of chromate of silver, rendered colourless by the sea-water up to the height to which it penetrates. The value of this instrument for guiding the navigator within what he calls "soundings" can hardly be exaggerated; with the sounding machine and a good chart he can generally make out his position correctly by a succession of three or four casts in a given direction at given intervals, and thus in foggy weather is made independent of astronomical observations and of the sight of lighthouses or the shore. By the proper use of this apparatus, such accidents as happened to the mail steamer *Mosel* not a fortnight ago would not be possible. As regards the value of the deep-sea instrument I can speak from personal experience, as on one occasion it enabled

those in charge of the cable s.s. *Faraday* to find the end of an Atlantic cable, which had parted in a gale of wind with no other indication of the locality than a single sounding, giving a depth of 950 fathoms. To recover the cable a number of soundings in the supposed neighbourhood of the broken end were taken, the 950 fathom contour line was then traced upon a chart, and the vessel thereupon trailed its grapnel two miles to the eastward of this line, when it soon engaged the cable 20 miles away from the point where dead reckoning had placed the ruptured end.

The time allowed me for addressing you on this occasion is wholly insufficient to do justice to the great engineering works of the present day, and I must therefore limit myself to making a short allusion to a few only of the more remarkable enterprises.

The great success, both technically and commercially, of the Suez Canal, has stimulated M. de Lesseps to undertake a similar work of even more gigantic proportions, namely, the piercing of the Isthmus of Panama by a ship canal, 40 miles long, 50 yards wide on the surface, and 20 yards at the bottom, upon a dead level from sea to sea. The estimated cost of this work is £20,000,000, and more than this sum having been subscribed, it appears unlikely that political or climatic difficulties will stop M. de Lesseps in its speedy accomplishment. Through it, China, Japan, and the whole of the Pacific Ocean will be brought to half their present distance, as measured by the length of voyage, and an impulse to navigation and to progress will thus be given which it will be difficult to over-estimate.

Side by side with this gigantic work, Captain Eads, the successful improver of the Mississippi navigation, intends to erect his ship railway, to take the largest vessels, fully laden and equipped, from sea to sea, over a gigantic railway across the Isthmus of Tehuantepec, a distance of 95 miles. Mr. Barnaby, the chief constructor of the navy, and Mr. John Fowler have expressed a favourable opinion regarding this enterprise, and it is to be hoped that both the canal and the ship railway will be accomplished, as it may be safely anticipated that the traffic will be amply sufficient to support both these undertakings.

Whether or not M. de Lesseps will be successful also in carrying into effect the third great enterprise with which his name has been prominently connected, the flooding of the Tunis-Algerian Chotts, thereby re-establishing the Lake Tritonis of the ancients, with its verdure-clad shores, is a question which could only be decided upon the evidence of accurate surveys, but the beneficial influence of a large sheet of water within the African desert could hardly be matter of doubt.

It is with feelings not unmixed with regret that I have to record the completion of a new Eddystone lighthouse in substitution for the *chef-d'œuvre* of engineering erected by John Smeaton more than one hundred years ago. The condemnation of that structure was not, however, the consequence of any fault of construction, but was caused by inroads of the sea upon the rock supporting it. The new lighthouse, designed and executed by Mr., now Sir, James Douglass, engineer of Trinity House, has been erected in the incredibly short time of less than two years, and bids fair to be worthy of its famed predecessor. Its height above high water is 130 feet, as compared with 72 feet, the height of Telford's structure, which gives its powerful light a considerably increased range. The system originally suggested by Sir William Thomson, some years ago, of distinguishing one light from another by flashes following at varied intervals, has been adopted by the Elder Brethren in this as in other recent lights in the modified form introduced by Dr. John Hopkinson, in which the principle is applied to revolving lights, so as to obtain a greater amount of light in the flash.

The geological difficulties which for some time threatened the accomplishment of the St. Gothard Tunnel have been happily overcome, and this second and most important sub-Alpine thoroughfare now connects the Italian railway system with that of Switzerland and the south of Germany, whereby Genoa will be constituted the shipping port for those parts.

Whether we shall be able to connect the English with the French railway system by means of a tunnel below the English Channel is a question that appears dependent at this moment rather upon military and political than technical and financial considerations. The occurrence of a stratum of impervious grey chalk, at a convenient depth below the bed of the Channel, minimizes the engineering difficulties in the way, and must influence the financial question involved. The protest lately raised against its accomplishment can hardly be looked upon as a public verdict, but seems to be the result of a natural desire to pause pending the institution of careful inquiries. These inquiries have been made by a Royal scientific Commission, and will be referred for further consideration to a mixed Parliamentary Committee, upon whose report it must depend whether the natural spirit of commercial enterprise has to yield in this instance to political and military considerations. Whether the Channel Tunnel is constructed or not the plan proposed some years ago by Mr. John Fowler of connecting England and France by means of a ferry boat capable of taking railway trains would be a desideratum justified by the ever-increasing intercommunication between this and continental countries.

The public inconvenience arising through the obstruction in traffic by a sheet of water is well illustrated by the circumstance that both the estuaries of the Severn and of the Mersey are being undermined in order to connect the railway systems on the two sides, and that the Frith of Forth is about to be spanned by a bridge exceeding in grandeur anything as yet attempted by the engineer. The roadway of this bridge will stand 150 feet above high-water mark, and its two principal spans will measure a third of a statute mile each. Messrs. Fowler and Baker, the engineers to whom this great work has been entrusted, could hardly have accomplished their task without having recourse to steel for their material of construction, nor need the steel used be of the extra mild quality particularly applicable for naval structures to withstand collision, for, when such extreme toughness is not required steel of very homogeneous quality can be produced, bearing a tensile strain double that of iron.

When the British Association met at Southampton on a former occasion, Schönbein announced to the world his discovery of gun-cotton. This discovery has led the way to many valuable researches on explosives generally, in which Mr. Abel has taken a leading part. Recent investigations by him, in connection with Captain Noble, upon the explosive action of gun-cotton and gunpowder confined in a strong chamber, which have not yet been published, deserve particular attention. They show that while by the method of investigation pursued about twenty years ago by Karolye (of exploding gunpowder in very small charges in shells confined within a large shell partially exhausted of air), the composition of the gaseous products was found to be complicated and liable to variation, the chemical metamorphosis which gun-cotton sustains, when exploded under conditions such as obtain in its practical application, is simple and very uniform. Among other interesting points noticed in this direction was the fact that, as in the case of gunpowder, the proportion of carbonic acid increases, while that of carbonic oxide diminishes with the density of the charge.

Messrs. Noble and Abel are also continuing their researches upon fired gunpowder, being at present occupied with an inquiry into the influence exerted upon the chemical metamorphosis and ballistic effects of fired gunpowder by variation in its composition, their attention being directed especially to the discovery of the cause of the more or less considerable erosion of the interior

surface of guns produced by the exploding charge—an effect which, notwithstanding the application of devices in the building up of the charge specially directed to the preservation of the gun's bore, has become so serious that, with the enormous charges now used in our heavy guns, the erosive action on the surface of the bore produced by a single round is distinctly perceptible. As there appeared to be *primâ facie* reasons why the erosive action of powder upon the surface of the bore at the high temperatures developed should be at any rate in part due to its one component sulphur, Noble and Abel have made comparative experiments with powders of usual composition and with others in which the proportion of sulphur was considerably increased, the extent of erosive action of the products escaping from the explosion vessel under high tension being carefully determined. With small charges a particular powder containing no sulphur was found to exert very little erosive action as compared with ordinary cannon powder; but another powder, containing the maximum proportion of sulphur tried (15 per cent.), was found equal to it under these conditions, and exerted very decidedly less erosive action than it, when larger charges were reached. Other important contributions to our knowledge of the action of fired gunpowder in guns, as well as decided improvements in the gunpowder manufactured for the very heavy ordnance of the present day, may be expected to result from a continuance of these investigations. Professor Carl Himly, of Kiel, having been engaged upon investigations of a similar nature, has lately proposed a gunpowder in which hydrocarbons precipitated from solution in naphtha take the place of the charcoal and sulphur of ordinary powder, this powder has amongst others the peculiar property of completely resisting the action of water, so that the old caution, "Keep your powder dry," may hereafter be unnecessary.

The extraordinary difference of condition, before and after its ignition, of such matter as constitutes an explosive agent leads us up to a consideration of the aggregate state of matter under other circumstances. As early as 1776 Alexander Volta observed that the volume of glass was changed under the influence of electrification, by what he termed electrical pressure. Dr. Kerr, Govi, and others, have followed up the same inquiry, which is at present continued chiefly by Dr. George Quincke, of Heidelberg, who finds that temperature, as well as chemical constitution of the dielectric under examination, exercises a determining influence upon the amount and character of the change of volume effected by electrification; that the change of volume may under certain circumstances be effected instantaneously as in flint glass, or only slowly as in crown glass, and that the elastic limit of both is dimished by electrification, whereas in the case of mica and of guttapercha an increase of elasticity takes place.

Still greater strides are being made at the present time towards a clearer perception of the condition of matter when particles are left some liberty to obey individually the forces brought to bear upon them. By the discharge of high tension electricity through tubes containing highly rarefied gases (Geissler's tubes), phenomena of discharge were produced which were at once most striking and suggestive. The Sprengel pump afforded a means of pushing the exhaustion to limits which had formerly been scarcely reached by the imagination. At each step the condition of attenuated matter revealed varying properties when acted upon by electrical discharge and magnetic force. The radiometer of Crookes imported a new feature into these inquiries, which at the present time occupy the attention of leading physicists in all countries.

The means usually employed to produce electrical discharge in vacuum tubes was Ruhmkorff's coil; but Mr. Gassiot first succeeded in obtaining the phenomena by means of a galvanic battery of 3000 Leclanché cells. Dr. De La Rue, in conjunction with his friend, Dr. Hugo Müller, has gone far beyond his predecessors in the production of batteries of high potential. At his lecture "On the Phenomena of Electric Discharge," delivered at the Royal Institution, in January, 1881, he employed a battery of his invention consisting of 14,400 cells (14,832 volts), which gave a current of 0·054 ampère, and produced a discharge at a distance of 0·71 inch between the terminals. During last year he increased the number of cells to 15,000 (15,450 volts), and increased the current to 0·4 ampère, or eight times that of the battery he used at the Royal Institution.

On the occasion of his lecture, Dr. De La Rue produced, in a very large vacuum tube, an imitation of the aurora borealis; and he has deduced from his experiments that the greatest brilliancy of aurora displays must be at an altitude of from 37 to 38 miles—a conclusion of the highest interest, and in opposition to the extravagant estimate of 281 miles at which it had been previously put.

The President of the Royal Society has made the phenomena of electrical discharge his study for several years, and resorted in his important experiments to a special source of electric power. In a note addressed to me, Dr. Spottiswoode describes the nature of his investigations much more clearly than I could venture to give them. He says: "It had long been my opinion that the dissymmetry shown in electrical discharges through rarefied gases must be an essential element of every disruptive discharge, and that the phenomena of stratification might be regarded as magnified images of features always present, but concealed under ordinary circumstances. It was with a view to the study of this question that the researches by Moulton and myself were undertaken. The method chiefly used consisted in introducing into the circuit intermittence of a particular kind, whereby one luminous discharge was rendered sensitive to the approach of a conductor outside the tube. The application of this method enabled us to produce artificially a variety of phenomena, including that of stratification. We were thus led to a series of conclusions relating to the mechanism of the discharge, among which the following may be mentioned:—

"1. That a stria, with its attendant dark space, forms a physical unit of a striated discharge.

"2. That the origin of the luminous column is to be sought for at its negative end.

"3. That the time occupied by electricity of either name in traversing a tube is greater than that occupied in traversing an equal length of wire, but less than that occupied by molecular streams (Crookes's radiations) in traversing the tubes.

"4. That the brilliancy of the light with so little heat may be due in part to brevity in the duration of the discharge.

"5. That striæ are not merely loci in which electrical is converted into luminous energy, but are actual aggregations of matter.

"This last conclusion was based mainly upon experiments made with an induction coil excited in a new way—viz., directly by an alternating machine, without the intervention of a commutator or condenser. This mode of excitement promises to be one of great importance in spectroscopic work, as well as in the study of the discharge in a magnetic field, partly on account of the simplification which it permits in the construction of induction coils, but mainly on account of the very great increase of strength in the secondary currents to which it gives rise."

These investigations assume additional importance when we view them in connection with solar—I may even say stellar—physics, for evidence is augmenting in favour of the view that interstellar space is not empty, but is filled with highly attenuated matter of a nature such as may be put into our vacuum tubes. Nor can the matter occupying stellar space be said any longer to be beyond our reach for chemical and physical test. The

spectroscope has already thrown a flood of light upon the chemical constitution and physical condition of the sun, the stars, the comets, and the far distant nebulæ, which have yielded spectroscopic photographs under the skilful management of Dr. Huggins, and Dr. Draper, of New York. Armed with greatly improved apparatus the physical astronomer has been able to reap a rich harvest of scientific information during the short periods of the last two solar eclipses; that of 1879, visible in America, and that of May last, observed in Egypt by Lockyer, Schuster, and by continental observers of high standing. The result of this last eclipse expedition has been summed up as follows:—"Different temperature levels have been discovered in the solar atmosphere; the constitution of the corona has now the possibility of being determined, and it is proved to shine with its own light. A suspicion has been aroused once more as to the existence of a lunar atmosphere, and the position of an important line has been discovered. Hydrocarbons do not exist close to the sun, but may in space between us and it."

To me personally these reported results possess peculiar interest, for in March last I ventured to bring before the Royal Society a speculation regarding the conservation of solar energy, which was based upon the three following postulates, viz.:—

1. That aqueous vapour and carbon compounds are present in stellar or interplanetary space.

2. That these gaseous compounds are capable of being dissociated by radiant solar energy while in a state of extreme attenuation.

3. That the effect of solar rotation is to draw in dissociated vapours upon the polar surfaces, and to eject them after combustion has taken place back into space equatorially.

It is therefore a matter of peculiar gratification to me that the results of observations here recorded give considerable support to that speculation. The luminous equatorial extensions of the sun which the American observations revealed in such a striking manner (with which I was not acquainted when writing my paper) were absent in Egypt; but the outflowing equatorial streams I suppose to exist could only be rendered visible by reflected sunlight, when mixed with dust produced by exceptional solar disturbances or by electric discharge; and the occasional appearance of such luminous extensions would serve only to disprove the hypothesis entertained by some, that they are divided planetary matter, in which case their appearance should be permanent. Professor Langley, of Pittsburg, has shown by means of his bolometer, that the solar actinic rays are absorbed chiefly in the solar instead of in the terrestrial atmosphere, and Captain Abney has found by his new photometric method that absorption due to hydrocarbons takes place somewhere between the solar and terrestrial atmosphere. In order to test this interesting result still further, he has lately taken his apparatus to the top of the Riffel with a view of diminishing the amount of terrestrial atmospheric air between it and the sun, and intends to bring a paper on this subject before Section A. Stellar space filled with such matter as hydrocarbon and aqueous vapour would establish a material continuity between the sun and his planets, and between the innumerable solar systems of which the universe is composed. If chemical action and reaction can further be admitted, we may be able to trace certain conditions of thermal dependence and maintenance, in which we may recognize principles of high perfection, applicable also to comparatively humble purposes of human life.

We shall thus find that in the great workshop of nature there are no lines of demarcation to be drawn between the most exalted speculation and commonplace practice, and that all knowledge must lead up to one great result, that of an intelligent recognition of the Creator through His works. So then, we members of the British Association and fellow-workers in every branch of science may exhort one another in the words of the American bard who has so lately departed from amongst us:—

"Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labour and to wait."

Parliamentary and Law Proceedings.

Poisoning by Washing Soda.

Mr. Carttar, West Kent Coroner, held an inquest on Saturday, August 26, at Greenwich, on the body of Sarah Ann Houess, five years of age.

The evidence of the mother was that on Wednesday she left the child at home by herself, and during her absence the child drank some water from a kettle on the hob, in which witness had placed a handful of common soda to cleanse it before leaving home. On her return she gave the child some magnesia, and she vomited, and did not appear much the worse, but the next day the symptoms were alarming and she went to the relieving officer and obtained an order for medical attendance. On Dr. Hartt seeing the child he found her in a dying state and gave no hopes of her recovery, and she died on Thursday afternoon. The child was in the habit of drinking from the kettle.

Dr. Hartt, the parish surgeon, said the appearances of the child were consistent with alkaline poisoning, and the child must have suffered great pain. Three ounces of common soda dissolved in water had been known to kill an adult, and the deceased was presumed to have taken about an ounce.

The jury returned a verdict that the deceased died from drinking common washing soda and water from a kettle by misadventure.

Children Poisoned by Laburnum Pods.

Dr. Scott, of Barnsley, has had under his care three children who narrowly escaped being poisoned by eating laburnum pods, in Loche Park, Barnsley. The lads, named Fisher, Siddons, and Adams, reside in Winn Street and Heeles Street. They went to the park, and seeing the pods on some laburnum trees, they mistook them for wild lints and ate a quantity of them. Fisher, who is about seven years of age, ate the most pods and was taken seriously ill on his way home. When he reached a field near the Agness Colliery he was unable to proceed further, and falling down exhausted, he was discovered two or three hours afterwards in an insensible condition. For some time he was not expected to recover. The other two lads were not so seriously affected as Fisher, but were ill for some time.—*Yorkshire Post.*

Poisoning by Spirit of Salt.

On the 24th ult., Mr. Collier held an inquest at Hackney on the body of George Childs, a butcher's assistant, aged 77. From the evidence it appeared that the deceased had been much distressed by the expectation that an allowance he received weekly from the parish would be stopped. He was seen to drink something that was smoking from a cup and immediately began retching. Medical assistance was obtained, but deceased died the same night, the doctor attributing the death to poisoning by spirit of salt.

The jury returned a verdict that deceased committed suicide whilst suffering from temporary insanity.

Correspondence.

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

The Future of Pharmacy.

Sir,—If "H. S." and "W. B." consider themselves merely *distributors* of drugs, then, doubtless, they have been considerably overpaid. It is no use waiting, as "H. S." suggests, for an Act of Parliament to raise our status, neither the present nor any future Government will grant us the sole right of dealing in non-poisonous preparations, and if we are to follow the advice of "H. S." and sink to the level of the grocer and the huckster, then we might as well give up the "poison" trade and become general dealers at once, without any special training or examination, for pecuniarily the poison trade could be very well spared. Any amelioration of our condition must come from ourselves and must be the result of our own combined and undivided efforts; we must teach the public that the pharmacist and the retailer (pure and simple) of drugs are distinct persons. But how can reform proceed from a body of men so many of whom have not nearly so much *esprit de corps* as a crossing sweeper and whose sole aim and purpose is, like that of the historic quaker, to make money somehow, honestly if they can, but anyhow to make it? Often when trying to persuade others to join the Society or contribute to the Benevolent Fund I am asked, "Why should I join or support such a Society whilst so many men who are officially connected with it are robbing me of my living by supplying all my neighbours with my particular class of goods?" I am quite sure that in this district at all events one of the main reasons for so few men joining us is the bad odour into which these men have dragged the Society. As to its being "pettish" to Boycott people who cater for grocers, stores, etc., I could tell "H. S." of one wholesale house whose loss of trade was such as to compel it to give up supplying stores. I could also tell him of more than one wholesale house who would refuse to supply them at any price. I do not wonder, if "H. S." be largely engaged in this class of trade, that (pecuniarily at all events) he is well satisfied with his position. I saw an order some time ago for 50 gallons of "paregoric without opium," which was supplied to a chemist at 1*s.* 3*d.* per lb., and by him sold to grocers, provision dealers, etc., for retail, at 2*s.* 8*d.* and 3*s.* per lb. The county analyst, it is true, objected to some of it, but these analysts are at times very fastidious. The police records have repeatedly shown the class of goods supplied by men whose position and education ought to place them far beyond every suspicion of such rascality. These men ought to be treated as the medical profession treat quacks and owners of "6*d.* dispensaries"—ostracize them altogether, have nothing to do with them, and show the public that though these individuals be with us, they are not of us; that while we do not forget that we are tradesmen, we remember that we are something better than mere retailers, and that the lives of our customers and the honour of our craft are worth more in our estimation than the mere acquisition of riches by means which would put even "the heathen Chinee" to shame.

131, *Embden Street, Manchester.* J. Hart.

Sir,—I think few of the readers of our Journal will disagree in the main with the two letters, signed respectively H. S. and W. B., but there are one or two points in that of the latter to which I beg to offer a protest. Firstly, the assertion that the profits of the chemist and druggist have been too high. Fifty years ago they may have been so, but of late years, No! If they have been, how is it that many, I might, I think, say most, have failed to make more than a living, possibly a comfortable one, but not sufficient for them to rest from their arduous labours?

Again, W. B. says his cutting neighbour makes as much per cent. on his turnover as is necessary to carry on his business. Very likely; but suppose he sold nothing but chemists' articles; how would he get on? For are there no profits in the drysaltery trade? There are; but the public does not know so well how much is got out of drysaltery. Not that I mean to say the profits are exorbitant; for where I sell a pound of Epsom salts my drysaltery neighbour will perhaps sell a hundredweight of soda, and why should he not get as much profit?

But fearing I am trespassing too much on your space, I would just say that I think if we were to write and work more in the direction of getting doctors to give up dispensing and yield us that most legitimate part of our business, we, on our part giving up counter prescribing, I say if we were to work more for this end, we should be doing more towards brightening the prospect of the future of pharmacy than the almost, if not quite useless discussions as to stores and cutting grocers will achieve.

G. A. C.

Leeches.

Sir,—My experience of leech keeping coincides very much with Mr. Lamble's; I only change the water once in six or nine months, and keep them in a shaded place. I also keep them well supplied with water plants, those I have found most suitable being the American water weed (*Anacharis alsinastrum*), and the pond weed (*Potamogeton natans*). During the last twelve months the "death rate" did not average one per month. I prefer to get the "weeds" from some pit or canal, rather than purchase them, as then they are invariably rich in the lower forms of life, and with a 1-inch lens or a good "platyscopic" "Aquam" may spend many a pleasant hour in watching the movements of the water flea or the cyclops, and studying the different forms of fresh water polype. I have also found the last two seasons that the leeches have deposited their ova on the sides of the glass, from which in due time a fresh generation of leeches has been developed; there ought to be from 3 to 4 inches of shingle at the bottom of the aquarium.

Manchester. J. Hart.

P.S.—For the past two or three weeks, from a variety of circumstances, I have not been able to keep up my supply of plant life, and the mortality, as a consequence, has rapidly increased.

Sir,—Allow me to say that my experience in keeping leeches agrees with Mr. Lamble's, and corroborates the conclusions he arrives at. For the last three years I have lost scarcely any leeches. I keep them in an aquarium on the counter, have no plants in the water, only sand and a few smooth pebbles. I change the water very seldom, only once in two or three months, unless a leech should die, or from any cause the water smells decidedly fetid; but, as a rule, for a long time the water has only a brackish smell, which I take no notice of. I sometimes clean down the inside of aquarium in the same water and leave it unchanged. I conclude that the leeches' natural *habitat* is in quiet undisturbed semi-stagnant waters. I only buy the best leeches. I may say that the water I use is similar to that used by Mr. Lamble, as I am a near neighbour. The character of the water may probably make a difference elsewhere. Observer.

"*North.*"—The point was fully discussed in this Journal about five years ago. See especially the opinion of Professor Redwood upon the meaning of symbols used in prescriptions (*Pharm. Jour.*, [3], viii., 471).

W. Johnston.—The plants sent are greatly in excess of the number we can undertake to name as a rule. In future the number must be limited to six. Those now sent are—1. *Tussilago Farfara.* 2. *Alchemilla vulgaris.* 3. *Angelica sylvestris.* 4. *Ægopodium Podograria.* 5. *Heracleum Sphondylium.* 6. *Lapsana communis.* 7. *Epilobium montanum.* 8. *Geranium robertianum.* 9. *Stellaria graminea.* 10. *Galium verum.* 11. *Lychnis vespertina.* 12. *Rumex Acetosa.* 13. *Torilis Anthriscus.* 14. *Centaurea nigra.* 15. *Scabiosa succisa.* 16. *Geum urbanum.* 17. *Prunella vulgaris.* 18. *Geranium dissectum.* 19. *Achillea ptarmica.* 20. Send specimen with stem leaves.

Communications, Letters, etc., have been received from Messrs. Della Rosa, Fletcher, Schacht, Woodland, Lubberly Lout, Wopper.

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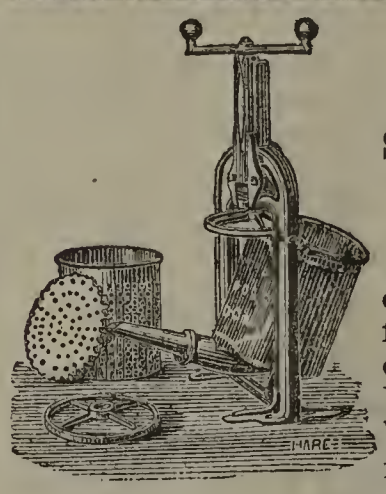

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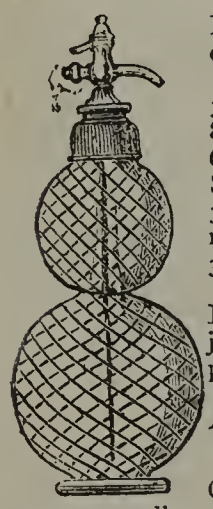

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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January, 1878. J. L. KIDDLE.

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St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

THE MASON SCIENCE COLLEGE,

BIRMINGHAM.

SESSION—1882-83.

DEPARTMENT OF SCIENCE AND ARTS.

The SESSION will commence on Tuesday, the 3rd of October, 1882.

Students under sixteen years of age are required to pass a Preliminary examination.

All Departments of the College are open to both sexes on the same terms.

The Calendar, containing full information as to the Classes, Fees, &c., is published by Cornish Brothers, New Street, Birmingham, price 2s.; by post, 2s. 4d.

GEO. H. MORLEY, *Secretary.*

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MINOR	One Guinea.
MODIFIED	One Guinea.
PRELIMINARY	Half-a-Guinea.

Those Students who failed at the recent Preliminary Examination, should join at once, in order to insure success at their next attempt. References given to successful candidates.

EXTRACTS FROM THE PRESS.

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"Mr. Wills, of Westminster College, one of our most thoroughly successful tutors, extends him a helping hand, leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness."—*Magazine of Chemistry and Pharmacy.*

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For syllabus, testimonials and full particulars, apply (enclosing stamp) to

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WESTMINSTER COLLEGE, TRINITY SQUARE, LONDON, S.E.

The London Hospital and Medical COLLEGE.

HOSPITAL STAFF.

Consulting Physicians—Dr. Herbert Davies, Dr. Ramskill.
Consulting Surgeon—Mr. Curling, F.R.S.
Physicians—Dr. Andrew Clark, Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom.
Assistant-Physicians—Dr. Charlewood Turner, Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Hutchinson, F.R.S., Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Fredk. Treves, Mr. C. Mansell Moullin.
Obstetric Physician—Dr. Palfrey.
Assistant Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. James Adams, Mr. Waren Tay.
Aural Surgeons—Dr. Edw. Woakes and Mr. T. Mark Hovell.
Surgeon-Dentist—Mr. Ashley W. Barrett.

LECTURERS.

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Jas. Adams.
Operative Surgery—Mr. Jas. Adams.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Rivington.
Practical Anatomy—Mr. Fredk. Treves.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Midwifery—Dr. Palfrey.
Toxicology—
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. C. Meymott Tidy.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy & Pathology of the Teeth—Mr. Ashley W. Barrett.

The SESSION 1882—1883 will commence on Monday, October 2nd, 1882, when an Introductory address will be delivered, to be followed by a Conversazione, to which all past and present Students are invited.

Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of In-patients during 1881 was 6,840, Out-patients 58,307.

THE RESIDENT AND OTHER HOSPITAL APPOINTMENTS are free to full Students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, and one Accoucheurship; also two Dresserships and two Maternity Assistantships.

TWO ENTRANCE SCIENCE SCHOLARSHIPS, value £60 and £40, and TWO BUXTON SCHOLARSHIPS, value £30 and £20, will be offered for competition at the end of September to new Students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first year's Students.

A Scholarship, value £25, in Anatomy, Physiology, and Chemistry, to second year's Students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

Prizes, value £60, to Dressers of Out-patients in Minor Surgery.

Special entries for Medical and Surgical Practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis.

For prospectus and particulars, apply personally, or by letter, to Mile-end, E. MUNRO SCOTT, Warden.

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Principal—Professor THOMAS WALLEY, M.R.C.V.S.

WINTER SESSION commences about 26th October.

Prospectus and full particulars on application.

CLASSES open to Amateurs.

PRELIMINARY.—Mr. T. S. TURNER, Head Master Grammar School, Hingham, Norfolk, having been very successful in passing Candidates for this examination, is desirous of forming a Class of youths under 16, to read for the January examination. Fees from Sept. 11th to Dec. 22nd, £12, including board, lodging and loan of books. Full particulars and pass list on application.

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IN THE

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Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

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The rooms are completely furnished with good laboratory, first class materia medica collection, and herbarium. Specimens of extracts, tinctures, &c., are provided for recognition practice. Dispensing and Latin being troublesome subjects receive their full share of attention.

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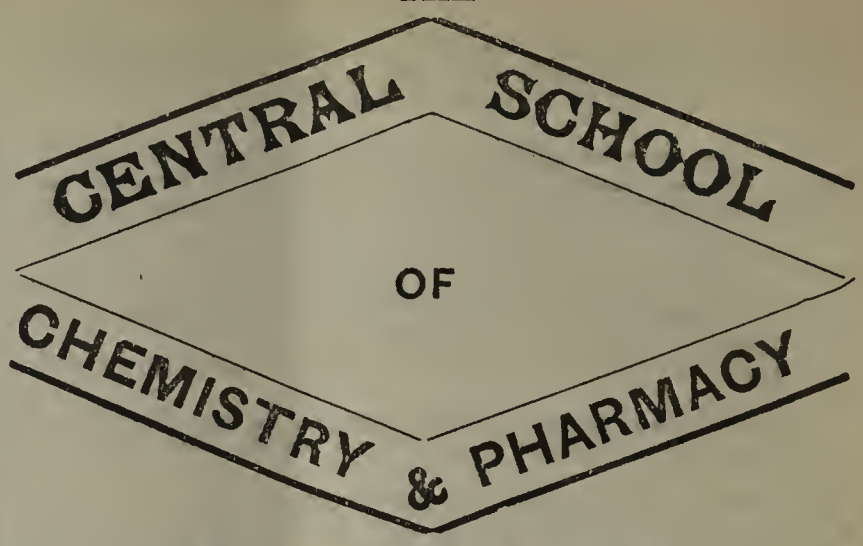

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This School will re-open on Friday, September 1st, when classes will be formed for the October and December Examinations. Fee for tuition during the October Course, 6 guineas; to December, 10 guineas; for the entire session, extending to July, 1883, 20 guineas. Apply to

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(*From the Royal School of Mines*),

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A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER and DECEMBER candidates. Enclose stamp for particulars.

Laboratory close to Gower Street Station.

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OF

Chemistry & Pharmacy,

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The Eleventh Session will commence on Friday, September 1st.

FEES.

Until the October Examination...	£4 4s.
Until the December ,, ...	£8 8s.
Until Qualified (Minor)	£10 10s.
Until Qualified (Minor and Major)	£15 15s.

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The above Classes will re-assemble on Tuesday, September 5th, at 7 p.m.

For Prospectuses and other information, apply to

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325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

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IMMEDIATELY.—As ASSISTANT to Surgeon in Retail or Dispensary. Good experience in Prescribing and Dispensing. Unexceptional reference. AQUA LAVANDULÆ, 1, Malvern Rd., Hornsey Park, Hornsey, N.

AS ASSISTANT. Out-door. Qualified. Age 23. Town and country experience. Good references. H. A., Mr. A. Rogers, High St., Newmarket.

JUNIOR or IMPROVER. Age 20. Height 5ft. 2in. London, Brighton, or S.E. coast preferred. Disengaged. J. B. F., 8, Fort Rd., Margate.

AS JUNIOR. Immediately. 4½ years' experience. Age 20½. Height 5ft. 7in. ALPHA, 59, Blackstock Rd., Finsbury Park, London, N.

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JUNIOR ASSISTANT. Apply personally to Messrs. J. ROBBINS & Co., 147, Oxford St., W.

FOR September 20th.–About 23. Competent Dispenser and good Counterman. Apply, stating height, references, when disengaged, and salary required, with carte (to be returned), to F. E. R., 101 & 103, Southwark St., S.E.

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2. LONDON, N.W.—Retail, Dispensing and Prescribing BUSINESS. Good position. Handsome shop. Returns £550. Price about £500. Good house. Rent £60, on lease.
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4. LONDON (about 15 miles from).—Prescribing and Retail BUSINESS, with but little opposition. In a rapidly increasing locality. Returns nearly £1000 yearly. Profits over the average. Price about £950.
5. EASTERN COUNTIES.—In a pretty locality. Good class BUSINESS, light Retail and Dispensing. Capital house, with a good garden, conservatory, &c. Splendid opportunity for an energetic man. Returns £925. Price required £800.
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"New York Medical Journal," *August* 1880, Dr. F. Weir, *in Lecture delivered to the College of Physicians and Surgeons, New York.*

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It is most efficacious when taken in the morning fasting, warmed to a temperature not below 60°, or when an equal quantity of hot water is added to it.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 637.] SATURDAY, SEPTEMBER 9, 1882. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 4th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The Sessional Prizes and Certificates will be distributed at this Meeting. Successful Candidates will be expected to attend. An Address to the Students will be delivered by JOSEPH INCE, F.C.S., F.L.S. *All Students and friends, ladies and gentlemen, are invited to be present.*

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH.

119A, GEORGE STREET, EDINBURGH.

The Society's Rooms will be closed from August 12th to September 11th.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Friday, October 6th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, will commence on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

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CHEMICAL FOOD

Syr. Ferri. Phosph. Comp. (SQUIRE).

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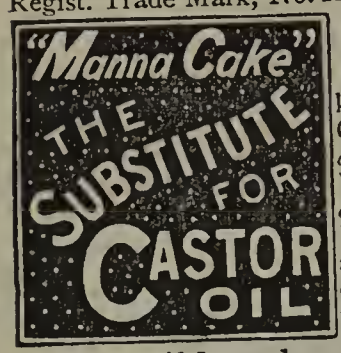

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A Handsome GOLD Show Card or Transparent Lid Box.

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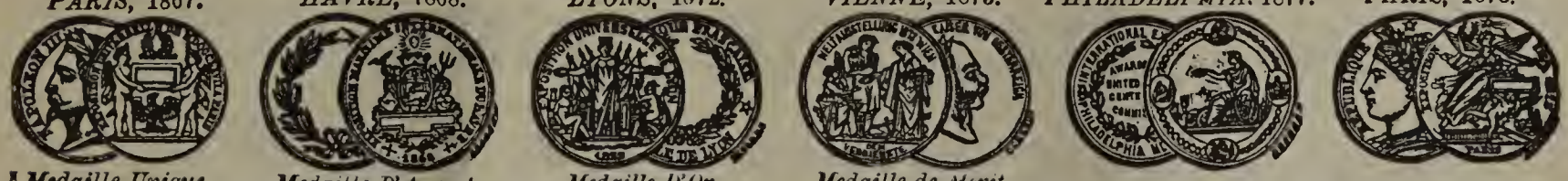

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SELTZER ..	11/- Hpr.,	25 bots.	
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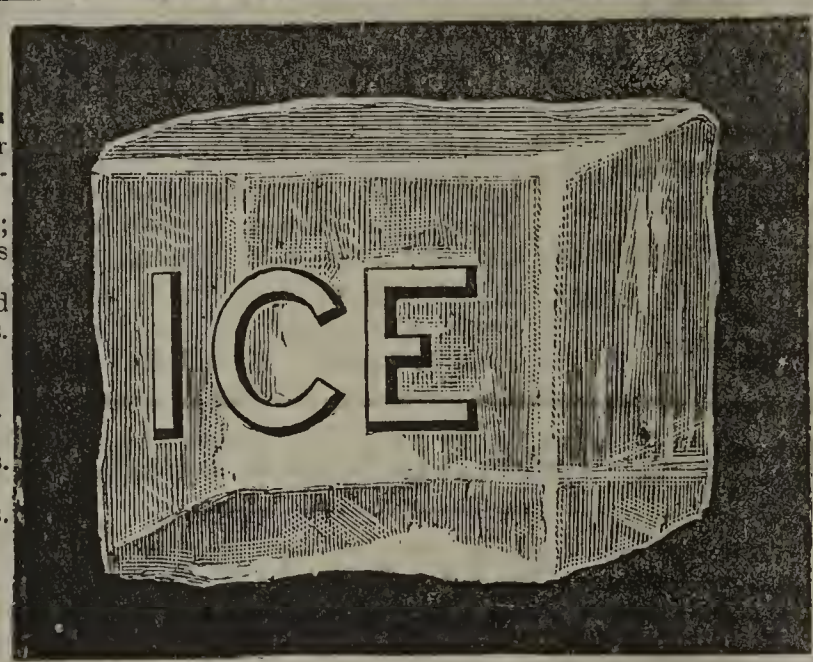

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BLOCK ICE.

Packing & Mats for Original Blocks free; 3d. each allowed for Mats if returned.

Low quotations given for quantities taken from vessels while discharging.

PRINTED DIRECTIONS for STORING ICE sent free on application.

W. B. HARRISON,

IMPORTER of ICE and MINERAL WATERS,

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THE NEW BLACK INK, different from anything else ever produced.

Writing becomes a pleasure when this Ink is used. It has been adopted by the principal Banks, Public Offices, and Railway Companies throughout Ireland.

It writes almost instantly Full Black.
Does not corrode Steel Pens.
Is cleanly to use and not liable to Blot.
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Blotting-paper may be applied at the moment of writing.

Can be obtained through BARCLAY'S, W. EDWARDS, NEWBERY'S, and MAW'S, London; MATHER'S, London and Manchester; GOODALL & Co., Leeds; EVANS & Co., Exeter; Mr. J. E. WILLIAMS, Chester; G. FLETCHER, Sheffield; Messrs. SANGER & SONS, 252, Oxford Street; Messrs. AYRTON & SAUNDERS, 149, Duke Street, Liverpool; JONES & Co., 98, Southwark Street, London. Sold in Jars, at 6*d.*, 1*s.*, and 2*s.* each.

BEWLEY & DRAPER, Limited, DUBLIN.

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AND

TRANSACTIONS

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(The LARGEST BONA FIDE Issue of any Journal addressing Chemists and Druggists.)

Terms for Advertisements may be obtained of the Publishers. Those for Engagements, Assistants, Businesses, &c., which must be prepaid, will be found on page xviii.

J. & A. CHURCHILL, NEW BURLINGTON STREET, LONDON, W.

DR. J. COLLIS BROWNE'S
CHLORODYNE
THE ORIGINAL AND ONLY GENUINE.

IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & Co., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

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EDITED BY
T. LAUDER BRUNTON, M.D., F.R.S.

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MADAGASCAR DRUGS.

BY E. M. HOLMES, F.L.S.

(*Concluded from page* 123.)

LEAVES AND FLOWERS.

FAMAMO, *Mundulia Telfairii*, Boj.—This drug consists of leaflets, mostly detached from their rachis, which bears scars of having borne four or five opposite pairs of leaflets. The leaflets are entire, slightly unequal at the base, about the size and shape of Tinnevelly senna, but more rigid and with many slender lateral veins placed at a very acute angle to the midrib. They have no odour; they taste somewhat like senna, but have an acrid after-taste. The young twigs are woody, with a pale brown bark having darker longitudinal stripes (See Famamo root, before, p. 121).

FANJANONANDRA.—This drug consists of the leafy shoots of *Anthospermum plicatum*, H.B., a heath-like rubiaceous undershrub. The leaves are opposite, about ¾ inch long, a line in breadth, decurrent and having opposite subulate stipules. When examined with a lens they are seen to have two lines at the back, which indicate the three close longitudinal plaits of the leaf, more easily seen on transverse section. Under a Coddington lens the leaf is seen to be studded with minute immersed oil glands. The taste is very bitter and aromatic, but not perceptibly astringent, and any hæmostatic power it possesses is probably owing to its essential oil. The Malagasy name means "stoppage of blood," and the drug is used for that purpose.

HARONGA.—This consists of the leaves or twigs of *Haronga Madagascariensis*, Choisy (Hypericaceæ). The leaves are opposite, smooth, short-stalked, oblong, entire, with prominent veins underneath, which are placed at almost a right angle to the midrib. The taste is very astringent. In Madagascar the leaves are used, as well as those of the Harongana kelifodia (*Psidium pomiferum*), in diarrhœa and dysentery. In Mauritius (according to Bouton, *l. c.*, p. 19) the yellow juice which flows from the incised stems is used as an application to ringworm and a skin disease called Tampane.

NIFIN AKANGA. (*Commelyna Madagascariensis*).—Bracts heart-shaped, seven veined, enclosing small blue flowers more conspicuous than the linear subulate leaves. Used in malarial diseases and as an application to recent sores, but possesses no marked taste or odour.

RAMBIAZANA.—The leaves are alternate, narrowly oblanceolate, entire, with three principal veins; about 1 to 2 inches long and ¼ to ½ inch broad, tapering much below, the leaves and stems being densely covered with down, which on the veins and stem is of a yellowish tint. The taste is aromatic and slightly bitter. The flowers are minute and in small corymbs, and apparently belong to the Compositæ, and, so far as can be judged from the imperfect material, an undescribed species of *Vernonia*. The plant is said to be emetic and expectorant.

SANGAN (*Sangan andivolahy*).—This consists of the flowers and unilateral flower-spikes of *Hyptis pectinata*, Poit. (Labiatæ), an undershrub, growing 6 or 7 feet high. The dried florets, which are not much larger than those of santonica, have a very bitter, slightly aromatic taste, resembling that of white horehound, for which it might perhaps form a substitute in Madagascar.

HANIDRAISÒA.—The leafy twigs of *Aphloia theæformis*, Benth. (Flacourtiaceæ). It is known to possess emetic properties. This plant is also called Voa-fotsy, and is said to be used in strangury or suppression of urine, in which emetics are known to be useful, probably by reflex action; also in dropsy and gonorrhœa.

The leaves are slightly bitter and astringent and have a flavour like that of tea. They are ovate, leathery, smooth, ¾ to 3 inches long, shortly stalked and serrate in the upper half.

TSIAVARAMONINA.—Leaves hispid, scabrous, crenate, alternate. Used with Hanisandroa for condylomata and other syphilitic tumours. Taste and odour not marked.

FRUITS AND SEEDS.

LANDEMO or TENDEMILAHY.—The fruits of *Anthocleista Madagascariensis*, Baker (*Journ. Bot.*, June, 1882, p. 173). These are small ovate fruits, with a dark brown wrinkled surface. A transverse section shows the fruit to be four-celled, the walls being soft and spongy. The taste is pleasantly bitter. The fruits are about the size of a hazel nut, but when mature are stated by Baker to be 1¼ inch long. These, as well as the leaves, are used in malarial fever.

SÈNA SÈNA.—Consists of dark brown fruits about the size of a walnut, the pericarp being dry and covered with rigid prominences or papillæ. It contains several (4 to 8) seeds, of the shape and size of the seeds of the Baobab tree, being convex on one side, and having the two other sides meeting at an angle. The seeds are immature, but appear to have ruminated albumen and a structure like that of the Anonaceæ. The fruits are used in coughs and catarrh, especially for children, one fruit being scraped for a dose. Judging from the warm aromatic taste of the seeds they probably act as a stimulant to the mucous membrane, like those of *Xylopia æthiopica*, A. Rich.

The fruit bears a strong resemblance to that of *Melodorum verrucosum*, in the Kew Museum, but that fruit is pear-shaped and contains plano-convex seed.

TAÌMBÒRON TSILOZA (*Chenopodium ambrosioides*, Lin.).—Used in Madagascar, as in other countries, as an anthelminthic, chiefly for round worms.

TANGENA.—A root named Titsarana and said to be the root of the Tangena, has a blackish, easily separable, scaly bark, the central portion of which is reddish and micaceous; the wood is whitish and porous, the medullary rays being visible to the naked eye as slender radiating lines. It has no perceptible taste.

TÀNANTÀNAMA-FOTSY (*Curcas purgans*, L.).—The seeds of this plant are well known to possess purgative and emetic properties. In Madagascar it is, however, chiefly used externally as a hæmostatic, a practice which is not unknown in India, where the milky juice is applied to wounds and in drying covers them with a varnish like collodion (*Pharm. Journ.*, [3], v. 1028; vii., 730). The hæmostatic property of the plant probably deserves more attention than it has hitherto received.

TÀNANTÀNA-MÀNGA (*Ricinus communis*, L.).—The seeds of the Madagascar plant are very small, being only about 5 or 6 lines long and 3 broad; they have a greyish tint. The oil is obtained from the seeds by boiling them.

TANTÈRAKALA (*Embelia micrantha*, Alp.).—These fruits are about the size of a red currant or black pepper. They have a wrinkled reddish-black husk or skin, which, when removed, is found to contain a single seed, which like others of the genus is readily distinguished by being marked with white dots

formed apparently by the infolding of the endopleura into the horny albumen; the lower half of the seed has a cup-shaped cavity. The taste is slightly acrid or pungent. In Madagascar the fruit is given for worms, the wood of the shrub being administered as a tonic. In the Mauritius, where it is called Liane Poilly,* after M. Grillot Poilly, who made known its value in nephritis, of which he was cured by a native by means of a decoction of the plant.

The fruits of another species, *E. Ribes*, Burm., are used in India as a remedy for the tapeworm, in the dose of a teaspoonful for a child and a dessertspoonful for an adult twice a day, and according to Dr. Dymock with success, the worm being expelled dead (*Pharm. Journ.*, [3], vii., p. 3; Dutt, 'Hind. Mat. Med.,' p. 183).

VÀTOLÀLAKA.—The grey seeds of *Cæsalpinia Bonducella*, Roxb., used by natives as parturient and emetic. In the Mauritius the leaves and seed of this plant are used for gonorrhœa and allied diseases, and the seeds powdered and mixed with pepper are used as a febrifuge. The Mauritius name† is "Sogar gota," and the French "Cadoque" (Bouton, 'Fl. Méd. de Maurice,' p. 43). This author appears to have followed Bojer in confounding this species with *C. Bonduc*, which has yellow seeds.

The dose used in Madagascar for promoting expulsion of the placenta is the kernel of one seed, scraped and drunk in water.

VÈRAKA.—The fruits of *Schrebera Golungensis*, Baker. These are fig-shaped, woody, about 1½ inch long, and ¾ inch broad in the widest part, dehiscing loculicidally into two valves, the dissepiments remaining attached to the valves. They have neither taste nor odour, and unless the seeds, which are not present, possess some marked properties, it is difficult to understand how the fruit can be of any service in dyspepsia or malarial diseases, for which, according to Dr. Parker, it is used, as well as for abscess.

VOANTAMÈNAKA-VAVY.—*Quisqualis* species. The drug consists of the fruit, which differs from that of *Quisqualis indica*, L., in having a short stalk ¼ inch long, in its more oval or globular shape, not tapering gradually towards the end, and in its pale brown colour.

It is stated by Dr. Parker (p. 669) to be used for flat worms of different kinds. For this purpose it is quite probable that it may be an effectual remedy, *Q. indica* being used in China, India and the East generally for lumbrici, four or five seeds being given to children to eat (Hanbury, 'Science Papers,' p. 231, fig. 3; Dr. Porter Smith, 'Chinese Mat. Med.,' p. 182; 'Ind. Pharm.,' p. 90). It is worthy of note, however, that Bouton ('Fl. Méd. de Maurice,' p. 53) states that in a larger dose than above mentioned the seeds of *Q. indica* produce spasms and other disagreeable symptoms.

ALOES.

Madagascar aloes presents an appearance resembling a black extract, but is brittle, like pitch. The powder is of a pale dull brown, with a slight greenish tint. The surface and the fracture have a glassy lustre. In odour and taste it resembles Cape aloes. When a fragment is treated with strong sulphuric acid on a piece of white porcelain it colours the acid yellow at first and then becomes pasty and colours it of a deep crimson. Nitric acid produces no effect upon it. A piece of Cape aloes treated in the same manner does not give a crimson colour with sulphuric acid, but with nitric acid alone, or with nitric acid added after sulphuric acid it gives a dark dull green colour. It would therefore appear probable that it is derived from a different species of aloe, probably the only large species known to grow in Madagascar.

VESICANTS.

The insect used as a vesicant in Madagascar, and which is a species of *Epicauta*, nearly allied to *E. rufficollis*, is rather smaller than the true cantharides, but similar in shape. It has a bluish metallic lustre, resembling that of the common *Meloe majalis*, except that the thorax is of a yellowish brown colour. According to Mr. Waterhouse, it differs from the Indian species, *E. rufficollis*, in having the scutellum yellow, the eyes more separated, the head more square behind, and the sculpture of the head and thorax generally more delicate. It has not as yet received a name.

The remainder of the drugs brought by Dr. Parker do not possess any distinctive taste or odour, or any properties which are worthy of notice.

* Bouton, 'Fl. Méd. de Maurice,' p. 92.

† See Baker ('Fl. Mauritius and Seychelles,' p. 83).

HAILSTORMS AND FORESTS.

The Geneva Correspondent of the *Times* writes, under date September 1:—"Hailstorms, as is well known, often play sad havoc in Switzerland as well as in other parts of Europe. They generally last only a few minutes, but in that time the crops of a whole district may be destroyed, trees stripped of their fruit and leaves, and even potatoes in the ground hacked to pieces. Birds are sometimes killed by the hundred, and a grape-vine touched by a hailstone is ruined for ever. Seven years ago there was a hailstorm in this canton, which in less than five minutes did damage estimated at a million of francs. In some districts there are mutual hail insurance societies as in other countries there are mutual fire insurance societies. In these circumstances everything relating to the phenomena and causes of these visitations is studied with great interest, and papers on the subject read at the late meeting of the association of Swiss Geographical Societies, held this week at Geneva, by Herren Beaumont and Riniker, of Aargau, are attracting considerable attention in scientific circles. The utility of forests as a safeguard against avalanches and a hindrance to *tourments* and snow-drifts has often been pointed out, but it has never before been suggested that forests are a preservation against hailstorms. Such, however, is the opinion of Herr Riniker, who is chief forester of Canton Aargau. He says that where there are forests there are no hailstorms, and in support of this theory he adduces a remarkable fact, for the accuracy of which he and many others can personally vouch. In the south of Aargau there is a little chain of mountains known as the Lindenberge. The Lindenberge are about 20 kilomètres long, of an average height, above sea level, of some 800 feet, and completely covered with wood. About twenty years, ago the forest was divided in two places by wide gaps, with the consequence that the valleys at the foot of the mountains were soon afterwards visited with frequent hailstorms. The hail-charged clouds were seen to traverse the gaps. In 1868 the wider of the two open spaces was closed by a plantation of firs, and since 1871 no hailstorm has crossed the forest. In explanation of this phenomenon Herr Riniker suggests that, as hailclouds are saturated with positive electricity and trees conduct from the earth negative electricity, the meeting of the two currents developes sufficient heat to prevent the complete congelation of the clouds and even to thaw the hailstones contained in them—for the clouds of this description pass very near the earth—and so convert the frozen particles into rain. If further observation should confirm the accuracy of Herr Riniker's conclusions in this regard, the importance of forests in countries where hailstorms are frequent will be greatly increased."

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 9, 1882.

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

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ROYAL COMMISSION ON THE MEDICAL ACTS.

ON a recent occasion we laid before our readers a *résumé* of the Report of the Royal Commission appointed last year to inquire into the working of the Medical Acts. At that time the evidence upon which that Report was based had not been published, but it has this week been issued in the form of a bulky blue book of more than four hundred pages. With respect to the general scope of the Report it will be remembered that it dealt with topics that, apart from their general public interest, were essentially and almost exclusively medical, whilst the subject of counter prescribing, to which numerous attempts at legislation as well as litigious experiences during recent years had given a somewhat factitious importance, was dealt with very curtly, and only by implication, in a single sentence which stated that in the opinion of the Commission it would be undesirable to prevent unregistered persons from practising, but that they should be prevented from representing themselves as being registered, or from assuming titles which would lead the public to believe that they are regular medical men. Of course this would include, and indeed go far beyond the limits of the "counter practice" which has been claimed as being within the right of chemists and druggists, and even this brief reference proves, so far as the Royal Commission reflects public opinion, that the position which has been maintained by chemists and druggists in respect to this question is in harmony with the feeling of the community in general.

It appears that very little evidence was presented to the Commissioners upon the subject of counter prescribing, and even this was mainly incidental to evidence upon the subject of unlicensed practice, using the term in the wide sense of doing all that a qualified practitioner may do. It may be of interest, however, to briefly indicate the nature of even this small amount of evidence.

First in importance, perhaps, should be ranked the evidence of Dr. B. W. RICHARDSON, on account of his appearing as the representative of the British Medical Defence Association. In reply to Professor HUXLEY, Dr. RICHARDSON said that the "tenour of the wish" of this Association is that every description of practice for gain by persons whose names are not on the Medical Register should be prohibited, and that the majority of the members desired to put a stop to "counter practice," in which feeling they were in accord with the general professional sentiment. He admitted, however, that there exists a difference of opinion upon this point, and that he himself differed from many of his colleagues, since he believed that such suppression was not possible or desirable. An enactment that would prevent a person from getting what help he might choose in a case of illness where, as put by Professor HUXLEY, "the local doctor, whatever his abilities may be, is a person whose habits are not altogether favourable to clearness of head," Dr. RICHARDSON considered would be a very strong measure, such as would not be likely to pass the House of Commons. The course favoured by this witness was the same as suggested by him some time since, that to a certain extent "counter practice" should receive formal recognition as an absolute necessity, and that "the Apothecaries' Company should take up the whole of that part of medicine." It is worthy of notice that as one of the elements to be taken into account in dealing with the question, Dr. RICHARDSON expressed an opinion that, at the present moment, in a political point of view the chemists and druggists are quite as potent as the medical profession, and that as "they have a Pharmaceutical Society conducting itself uncommonly well in the matter, and "with such authority that they are outbidding the "profession of medicine" (whatever that may mean), the best course would be "to allow a certain limited measure of counter practice."

Mr. H. NELSON HARDY, President of the Medical Alliance, was unable through illness to attend the Commission, but sent in a long statement on behalf of that Association. In it, under the head "Unqualified Practice," the fact is recalled that in the Government Bill of 1870 was a provision for repealing sections 9 to 24 of the Apothecaries Act, 1815, and the opinion is expressed that the repeal of the 20th or penal section, without the enactment of any equivalent, "would have thrown open the practice of medicine to the fourteen thousand chemists who now keep shops in England and Wales." By the way, it may be remarked that this is far in excess of the number of chemists and druggists keeping open shop, even when Scotland is included. The "equivalent" that Mr. HARDY proposes, if the penal clause be repealed, is to the effect that "Any person registered under the Act who for gain engages in the "medical treatment of diseases shall for each offence "be liable on summary conviction to a fine not exceeding £20." The statement includes a pretty full abstract of the report of the case of the *Society of Apothecaries* v. *Shepperley*, though whether the writer is satisfied or dissatisfied with the result in that case is hardly evident. Mr. HARDY's absence saved him the necessity of having to explain more in detail how he would suppress "counter practice."

Dr. JAMES GREY GLOVER, whose connection with

the *Lancet* gives additional interest to his opinion, when asked whether he would extend the penal clauses so far as to bring "counter practice" under their cognizance, replied that he would not, although in taking that position he thought he was perhaps not representing general opinion. He believed that counter practice never could be stopped, and that it was not desirable that it should be. But if a chemist and druggist went out to visit and posed as a medical man, and carried on medical practice in the ordinary sense of the word, or in severe cases, he thought a clause should be so constructed as to overtake that kind of practice. Whilst he would do nothing against quackery as such, but leave the utmost freedom to the public to employ whom they please, he would punish the false use of titles very severely. It may be hoped that this rational view will become more and more characteristic of the staff of our esteemed contemporary.

The foregoing will give a fair idea, we believe, of all which is to be found in these "Minutes of Evidence" that applies strictly to what is entitled to be termed "counter practice." There is much besides that refers to irregular medical practice, but some of it is of such a nature as to indicate that one of the most pressing problems to be solved is how best to bring the qualified and registered *mal*-practitioner under control. As might have been expected from the terms of the Report, the whole tenour of the evidence given on the subject of "counter practice" justifies the position taken up by the Pharmaceutical Society in relation to it. It has not been the policy of the Pharmaceutical Society to foster or in any way encourage irregular medical practice, but simply to insist that if a chemist and druggist thinks fit to sell to a customer who demands it a remedy for a simple ailment he is acting within his right and does not render himself liable to a legal penalty. But, as has often been pointed out in these columns, the real remedy against "counter practice" lies in the hands of the medical profession to apply; for there can be little doubt that in proportion as chemists and druggists are entrusted with the work for which they are specially trained, namely the dispensing of the prescriptions of qualified practitioners, they will be less inclined, even in semblance, to encroach on the domain of medical men.

PHARMACEUTICAL GATHERINGS.

At the time of writing this note the Annual Meeting of the German Pharmaceutical Association is being held in the city of Berlin, under the presidency of Dr. Brunnengräber, and it is pleasant to know that invitations to be present at this meeting have been courteously forwarded to several English pharmacists. In Germany the business of the Annual Meeting extends over four days, and besides being associated with a pharmaceutical exhibition it is enlivened by several social gatherings; this year it commenced on Tuesday last and culminates on Friday evening in a visit to the Zoological Gardens, where there are to be a concert, supper, fireworks and ball.

On Tuesday next, the 12th inst., the American Pharmaceutical Association is to commence its Annual Meeting, at Niagara Falls, and although this is also a "far cry," an invitation to British pharmacists from the President, Professor P. W. Bedford, has not been wanting. By the courtesy of Mr. G. S. Seabury, we have been favoured with an early copy of the programme, from which we learn that the proceedings at this meeting also last four days. Concerts and excursions to the "rapids" and other places are to vary the monotony of the business, and the meeting promises to be a very successful one.

Close in succession comes the meeting of the Austrian Pharmaceutical Association in Agram, the principal city of Croatia, the reception of guests commencing on Saturday evening, and the opening meeting taking place on the following day. Here again the local Association extend a cordial invitation to the members of other pharmaceutical associations, and we have no doubt that this welcome might be construed to include the pharmacists of this country. It is proposed to bring this meeting to an end by an excusion to Banjaluka, in Bosnia, on Tuesday, the 19th.

It is worthy of notice that in all these cases there is a fixed tariff for the tickets entitling the holder to partake in the festivities of the meeting. It appears to be considered, and we believe rightly so, that all that is to be expected from the local members is that they should make such arrangements as shall best secure the comfort of their visitors, and see that they are effectually carried out. No doubt in most cases this expectation is exceeded, but at any rate it is left with those most concerned to determine to what extent extra expenses shall be incurred.

THE LIBRARY AND MUSEUM.

We are requested by the Secretary, in order to prevent disappointment, to remind our readers that, in accordance with a resolution of the Council at its meeting in July, the Library and Museum will be closed entirely during September for repairs.

FIRE AT A CHEMIST'S.

We regret to learn that in the course of a destructive fire, which broke out in St. Albans shortly before midnight on the 26th ult., the premises of Mr. Arthur E. Ekins, pharmaceutical chemist, and Local Secretary to the Pharmaceutical Society, were nearly entirely destroyed. The fire appears to have originated in the cellar of an ironmonger next door, in which a large quantity of petroleum and colza and linseed oils was stored.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 192.)

Upon resuming, the first paper read was—

A New Styptic of Indigenous Growth.

BY PROFESSOR QUINLAN, B.A., M.D., M.R.I.A., F.K.Q.C.P., *Senior Physician to St. Vincent's Hospital, Dublin; Professor of Materia Medica and Therapeutics to the Catholic University, and Examiner in the same to the Royal University of Ireland.*

The great advances of chemical and of physical science and their application to medical and surgical purposes have much enlarged the means available for the treatment of disease, and in few departments more than in those connected with pharmacy, which, partly owing to chemical research and partly to botanical discovery, have expanded into an important speciality in the hands of eminent special investigators. It is, however, hardly to be doubted that all this great progress is accompanied by a certain disadvantage in medicine and surgery as well as in pharmacy. In the former we have at our disposal the microscope, chemical tests and other means of precision, which are rapidly giving to several departments of the healing art somewhat of the aspect of exact science; but often we are disposed to lean too much upon those scientific aids and to neglect that minute observation of symptoms by which the old physicians, all unlearned in science, accomplished such wonders of diagnosis. Similarly, in pharmacy, the great advances made by our special inquirers cause us to look towards purely chemical remedies and to overlook many of the valuable old simples which in their day were found so useful; and in discarding which we have (while getting rid of much rubbish) certainly sacrificed some really potent drugs. Many of them are safe, efficacious and accessible; and I propose briefly to bring under your notice one of them, which in its day had a great reputation, but which in latter times has been quite forgotten, with which I accidentally came in contact, and on investigation found very useful.

About a twelvemonth ago I was paying a domestic visit to a rather primitive part of the country, and when walking through the fields was urgently requested by the family of a small cottager to come to the aid of a little child who was stated to be bleeding to death. I found that this young patient was suffering from croup, and that on his windpipe some leeches had been incautiously applied by the cottager's family. Everyone knows the difficulty frequently found in stopping such hæmorrhage in infants; and it is a maxim in such cases that leeches should always be applied in some position where pressure can be resorted to if necessary. In this case the least pressure caused the appearance of immediate suffocation; the child had become quite blanched, and being away from home and not on professional duty I had no surgical appliances about me. I was having a search made for cobwebs and was about to heat a small piece of iron, when a neighbour came in with a large handful of leaves which he chewed and applied to the bleeding spot with immediate success. I recognized the leaves as those of the *Plantago lanceolata*, or ribbed grass; and a number of trials made in hospital and elsewhere satisfied me as to their hæmostatic power, either in the chewed form or in that of the dried leaves, applied to bleeding surfaces. Satisfied as to efficacy, my next effort was to examine whether the observation had been anticipated by others; and I found that while modern writers are silent upon the matter, it is referred to enthusiastically by their predecessors from Pliny down to old Culpepper, "Student in Physick and Astrology." Shakspere alludes to it on several occasions; for example, Romeo, speaking of a wounded shin, says—

"Your plantain leaf is excellent for that"
(Act i., scene 2);

and, again, in reference to a wounded head (in 'Love's Labour Lost')—

"No salve, sir, but a plantain"
(Act iii., scene 1).

Culpepper's 'Herbal,' p. 285, contains the following statement:—

"The juice of the plantain clarified and drank for divers days together stayeth all manner of fluxes, even womans courses when they flow too abundantly. It is good to stay spitting of blood, or the making of foul or bloody water, also too frequent bleeding of wounds."

I may further mention that the Gaelic name of the herb is equivalent to the words "healing plant."

The plantains constitute in themselves a small natural order, and are described in detail in Sowerby's 'English Botany,' vol. vii., pp. 166 to 175, both inclusive. This little order contains two genera, viz., the *Plantago*, which embraces five species; and the *Littorella*, to which we need not further allude. The two herbs which I found useful are the *Plantago lanceolata*, var. *vulgaris* (Sowerby, plate, 1164), and the *Plantago lanceolata*, var. *timbali* (Sowerby, plate, 1165), both of which are simply ribbed grass, and to be met with in every meadow; in fact, as the great Roman naturalist, in lauding them, quaintly says "trodden under every man's foot." After a careful series of experiments I have arrived at the following preparations, which I here exhibit, and for the goodness of which it will be sufficient to say that they have been prepared by Dr. John Evans, State Apothecary and Chemist to the Queen and to the Prince of Wales, 49, Dawson Street, Dublin. They are:—

1. The dried leaves of both species. They are intended for external application, and their action is partly physiological and partly mechanical. In fact it much resembles that of matico, and like it it is somewhat ribbed.

2. A species of external linctus, comprising the leaves pounded in a mortar with glycerine added to preserve them. This is intended to imitate the chewed leaves, and to be available at a time of year when the green leaves might not be forthcoming.

3. The juice with sufficient alcohol to prevent it spoiling. This is intended for internal use. It has a hot astringent taste, but not disagreeable, and somewhat reminds one of that of the cardiac tincture of rhubarb.

4. The juice with glycerine. This was designed for physiological experiment on the capillaries, so as to avoid the fallacy incidental to an alcoholized preparation, and for cases in which alcohol would be unsuitable.

5. The green extract. This is made in the ordinary way, first separating the chlorophyll, then eliminating the albumen, and finally reducing the juice and chlorophyll to the consistence of an extract. With this preparation I have not as yet obtained satisfactory results.

Chemically examined the plantain juice is found not to be a tannin, and to be compatible with both the ferrous and ferric salts, the alkaloids, metallic salts, and the preparations of ergot. For obvious reasons in all the chemical and physiological experiments I employed the plantain juice pure, but its compatibility with well-known astringents and hæmostatics is, of course, an additional recommendation. The juice evaporated to dryness and incinerated yields an ash, containing much phosphate and scarcely any carbonate. If the tail of a gold fish be placed in the field of the microscope at 400 × so as to well display the circulation, and if the juice be applied to the web, after a little the following remarkable effects are observed. The circulation in the larger vessels is not interfered with, but in the capillaries there is a tendency to retardation, almost amounting to stasis. It is thus evident that the juice possesses hæmostatic properties, due to some vegetable principle, which is not a member of the tannin series so common in the vegetable kingdom. It is probably to this principle that the hot astringent taste is due.

This would not be the place to enter into therapeutical

details. I will, however, ask the indulgence of the Conference to permit me to say that I have constantly used the leaves, and with the very best results, in cases of external hæmorrhage suitable to styptics. In cases of internal bleeding from the lungs, the kidneys, the bowels, and in menorrhagia I have got fair results from large and repeated doses of the juice, either fresh or fortified with alcohol or glycerine.

I recommend with confidence this ancient and once well-known styptic, so safe, so accessible, and, as I have found, successful. Many valuable lives have been saved, in the absence of surgical appliances, by the impromptu tourniquet of a pocket handkerchief tied round the bleeding limb and twisted with a stick. In like manner it can at least do no harm to furnish the practitioner in an emergency with a means of arresting capillary hæmorrhage, which, should regular medicaments be not forthcoming, can be obtained in the nearest field or rural path in any quantity, and by the most uninstructed persons.

The PRESIDENT, having proposed a vote of thanks to Professor Quinlan, said it would be interesting to know his opinion as to whether styptics acted chemically or physically, and if chemically, whether he thought it possible that one principle or more than one produced the action; if physically, as it would seem to act in the case of the tail of the fish, whether by exosmosis or endosmosis. He might not be able to give much information on these points at present, but from the skill with which he had treated this paper it was to be hoped that he would continue his researches on styptics, so that at some future time he might give the Conference a paper on the general action of styptics.

Professor TICHBORNE said there was no doubt that a great many of these old remedies had been sadly neglected of late years, and very good reasons had now been given why this one should be resuscitated, assuming it proved perfectly efficacious, because it was always at hand. He should like to ask how the succus was prepared, for he observed that it had a very dark colour, and the question occurred to him whether a stone or an iron press or mortar had been used. He would also ask if Professor Quinlan had investigated it for substances allied to catechuic acid or catechu compounds, which did not, under ordinary circumstances, give the strong reactions with iron which were found with ordinary tannic or gallic acid.

Mr. GILES said he might mention, as germane to the subject, another indigenous plant of very common occurrence, which also had valuable properties, viz., *Scrophularia nodosa*, a plant which when applied to that troublesome malady, a boil, in its inflammatory stage, was more effectual in subduing the irritation than anything he had ever met with.

Mr. GERRARD asked if Professor Quinlan had experimented at all with this drug in cases of diarrhœa, to ascertain if it was a good internal astringent as well as external. The paper was interesting, as it added another to the list of astringents which acted as such without the presence of tannin. Professor Quinlan had spoken of the action of the glycerine extract on the capillaries, and of the care he took to avoid the use of alcohol, but he did not see much difference between the addition of ordinary alcohol and glycerine to the preparation, glycerine itself being an alcohol; it was a very powerful body; when applied locally, it abstracted water, and in the pure state acted as an irritant.

Mr. PLOWMAN said a styptic might act chemically, perhaps more particularly in favouring the coagulability of the blood, or it might act by causing contraction of the smaller blood vessels. In the experiment on the tail of the fish, Professor Quinlan did not say whether the smaller blood vessels were contracted or not, or whether the stasis or condition approaching stasis took place without any diminution in the calibre of those smaller vessels. In all probability if there were such an actual diminution in the calibre, the active principle in the styptic would act through the nervous system.

Mr. BROWNEN asked whether any experiments had been made to ascertain the effect of the chewed leaves as compared with whole ones; the process of mastication was the initiatory process of digestion and might possibly set free the styptic agent existing in the leaves, or cause the development of something not present in the natural leaf. If it were so it would facilitate the identification of the styptic body.

Mr. SCHACHT would like to ask one further question, though its solution would not bear on the power of the juice or of the medicinal properties which were said to exist; but it might help to explain the first experiment which brought this matter under Professor Quinlan's attention, namely, the external application of the leaves in mass. Had Professor Quinlan in his microscopical examination directed attention to the leaf itself, to see whether or not it was covered with any special hairy processes which might serve the well-known purpose of distributing the blood over a large surface and thus promoting its more speedy and complete coagulation.

Mr. POLLARD said it was desirable to be as precise as possible in the terms made use of, and it did not seem to him that the word linctus was quite appropriate in this case.

Professor QUINLAN said he quite admitted that, and should be glad of any suggestion which would enable him to get rid of it.

Mr. SOUTHALL said that this interesting paper was very appropriate after the remarks in the President's address on the knowledge or want of knowledge possessed by chemists and druggists of our indigenous plants. If one looked at old herbals the great bulk of the plants were said to possess the same properties, so that one could not gather much information from them; the same set of qualities were attributed to a large number of very different plants. The use of some of these old plants seemed to be now revived, for instance, parsley-piert (*Alchemilla arvensis*) and crouch grass (*Triticum repens*) were not unfrequently used both by herbalists and in pharmacy.

Mr. BORLAND inquired if any investigation had been made as to the season at which these leaves were collected. Attention had already been drawn to the very proper point that regard should be paid to the period at which the collection of the articles of the materia medica was made. He might add that the *Plantago lanceolata* had long been used as a styptic in the part of Scotland from which he came, applied to cut wounds. Farm servants, when they met with any accident, would take one of the long leaves and bind it round the part; but the argument advanced in support of its medicinal action was solely a mechanical one, and he was not aware until now that it was supposed to possess any other property than that of acting as a covering to the wound. He should like to know if the plant was believed to possess these medicinal properties at all seasons of the year when it was found.

Professor QUINLAN said he wished he had heard some of these suggestions before, but he had noted them carefully, and would endeavour to take advantage of them. It appeared to him that the action of the plantain in either the dried or chewed form, but particularly in the dried form, was partly mechanical and partly physiological, but he had no means of saying whether it was also chemical. The first question put by Professor Tichborne was as to how the juice was prepared, and he might say that when he took a bale of leaves to Dr. Evans and told him what he wanted, that gentleman expressed his regret that a powerful hydraulic press which he possessed was out of order. But he told him that even if it had been in order he should have asked him not to use it. It was prepared in a large marble mortar and pestle, worked by two men. He attributed the dark colour to the chlorophyll. He thanked Professor Tichborne for the suggestion about catechuic acid, which had not occurred to him,

but he would look into it. Mr. Giles's remark was most valuable, and confirmed the idea he had formed that in throwing over a great mass of rubbish they had at the same time sacrificed a number of very useful remedies, many of which were described in the old book of Nicholas Culpepper, student in astrology and physic, as he described himself. He stated that this was a herb of Venus and not of Mars, but he had not thought it necessary to trouble the Conference with the astronomical portions of his directions. That very morning he had heard from a member of the Conference a remarkable example of one of these old remedies, which had proved immediately efficacious in the cure of some children suffering from chronic whooping cough, one of the most troublesome maladies with which the physician had to deal, and which was almost impossible to cure except by change of air. He should make it his business to look up this local herb, ascertain its scientific name, and investigate its properties. He had not tried the plantago in cases of diarrhœa, but simply as a styptic. With reference to the question of alcohol and glycerine, when he tried any experiments of this kind he always made it a rule to try the effect of the subsidiary agents by themselves; he tried both alcohol and glycerine in the diluted form, and found under the microscope that alcohol caused certain effects which glycerine did not. There was nothing one required to be more careful of in conducting any research than these side effects, which one did not expect. These leaves were collected in May and June, when they were in perfection. He had not examined them microscopically; no doubt if they were so examined something would be found which would account more or less for their mechanical action.

A paper was then read entitled—

Some Experiments on English Oil of Lavender.

BY W. A. SHENSTONE.

Oil of lavender has been the subject of several researches, most of which have been undertaken by foreign chemists, the following being among the chief statements that have been made concerning it.

1. That it sometimes deposits camphor in cold weather, and that the camphor is identical with common camphor. Most of the experimenters who have obtained camphor from this oil, however, have probably done so after the application of some oxidizing process; further, Messrs. Flückiger and Hanbury state in 'Pharmacographia' that they have not been able to ascertain the above fact, and after some experience in the manufacture of the oil, and a good deal of observation during the last ten years, I also have been unable to obtain any confirmation of the first part of this statement, so that I think it is probably erroneous.

2. That it contains a hydrocarbon, isomeric with that from turpentine oil, which is said by Lallemand to boil at so high a temperature as 200° C. to 210° C., and which does not yield a crystalline hydrochloride. It will be seen in the sequel that recent experiments do not confirm these statements concerning the properties of the hydrocarbon in lavender oil.

The most recent contribution to the subject is that of M. Bruylants, an account of which appears in the *Journal de Pharmacie et de Chimie* for 1879.

M. Bruylants working with pure oil of French lavender flowers has obtained from it, by fractional distillation to the amount of 25 per cent., a product which after rectification over sodium he recognized as a terpene by its boiling point, 162° C., its vapour density and its action with iodine. When strongly cooled and treated with hydrochloric acid gas, it yielded a solid hydrochloride. He also believes the oil contains, to the extent of 65 per cent., a mixture of borneol and camphor, being led to this conclusion by the facts that determinations of carbon and hydrogen give numbers which are consistent with such an hypothesis; that after treatment with a mixture of potassium bichromate and dilute sulphuric acid it yielded camphor, and after treatment with phosphorus pentoxide he obtained a mixture of a terpene and cymene. The former in greater proportion however.

As M. Bruylants was unable to separate any solid constituent by applying to the mixture a temperature of −25° C., and as there are many cases in which the solid constituents of similar oils are separated quite easily by cooling, I am inclined to doubt their presence in this case, especially as M. Bruylants' results are consistent with other explanations. Cymene is not unknown as an apparent constituent of essential oils, so that its isolation by the above method is hardly a sufficient indication of the presence of camphor. And again, since bodies having the same composition as camphor have been obtained by the action of oxidizing agents on several substances, its isolation under these circumstances rather suggests that the above constituent consists of one or more liquid oxygenated bodies which yield camphor when treated with oxidizing agents, and that French lavender oil is in the main a mixture of these and of the above described terpene.

About six years ago Dr. Tilden was kind enough to put into my hands a considerable quantity of fine English oil of lavender, and I devoted a good deal of time to its examination. My results are by no means complete as, unfortunately, all my material was destroyed in a fire which occurred at Exeter in 1878, and I have been deterred from returning to the subject since by pressure of other engagements, and by the very high price of the material. Probably I should not have brought them before the Conference now had not the experiments of M. Bruylants on French oil seemed to me to give an interest to my incomplete work which by itself it hardly possesses.

The quantity of material with which I experimented was rather more than 850 cubic centimetres. When distilled about one-third came over below 185° C., and one-half of the remainder between 185° C. and 207° C. The distillation was stopped at this stage as there was evidence of decomposition. An aqueous liquid, acid to litmus, came over with the distillates. The residue in the retort was finally distilled in a current of carbon dioxide, keeping the temperature low, in order to lose as little of the volatile constituents as possible. The portion distilling below 185° C. was again distilled, ebullition began at about 176° C. and nearly half came over below 180° C. The various portions which distilled above 180° C. were fractionated so as to get as much as possible of the lower boiling product, which was added to the above. During these operations there was constant separation of water, and I may here observe that this occurred throughout my work; portions which had been heated for weeks with metallic sodium still yielding traces of moisture when subsequently distilled.

The result of these operations was that I had a product boiling at 176° C. to 180° C. amounting to nearly one-third of the oil taken, about the same quantity boiling from 200° C. to 207° C., 140 c.c. boiling a few degrees above 180° C., and a black resin amounting to about 25 per cent. of the substance operated on. There is no doubt from the results of a distillation *in vacuo*, subsequently described, that this last was to a great extent a product of decomposition.

The portion which boiled below 180° C. was digested for many days with large excess of metallic sodium, the liquid being from time to time distilled off from a brown solid which separated, steam distillation being employed when necessary to avoid the application of excessive heat. The product was fractionated and the portion which then came over at 170° to 175° C. was subjected to further prolonged treatment with sodium to destroy oxygenated compounds, and finally yielded a liquid which distilled at 167° to 169° C. The quantity of this substance was less than 1 per cent. of the oil taken, and as I

could not hope to further purify so small a quantity, I decided to examine it.

I had no apparatus for organic analysis at the time and by Dr. Tilden's kind consent Dr. G. H. Morris made some analyses of it for me. He found that it contained about 3 per cent. of oxygen, but had a vapour density nearly corresponding to that of a terpene of formula $C_{10}H_{16}$. I myself examined the very small quantity which remained from his experiments, and found that the substance was a colourless oil with a camphoraceous fragrant odour, but not that of lavender oil. When well cooled with ice and salt and saturated with hydrochloric acid gas it yielded white needle-like crystals of a hydrochloride, which I collected and dried by pressing between filter paper. I was, however, unable to examine or preserve them as the quantity was too small for purification, and in their then impure state they quickly melted at ordinary temperatures and so disappeared. When treated with hydrochloric acid and subsequently with ferric chloride the oil behaved like a terpene. These results seem to indicate that it was a terpene, but still contained a little of the higher boiling constituents of the oil.*

Unfortunately my examination of the higher boiling fractions was hardly begun before it was brought to a close by the fire previously alluded to. In the course of the separation of the small quantity of terpene, however, I observed that under the action of heat they were modified with the production of water and with an increase of boiling point. In an experiment to test this point I found that a portion of the oil, which boiled at 184° C., after heating for two hours and a quarter with an inverted condenser had its boiling point raised to 192° C., but that subsequent heating had not much effect upon it.† As regards the composition of this part of the oil, it appears to be highly oxygenated. Dr. Morris has made an analysis of a fraction boiling at about 200° C. and he found that it yielded only 83·6 per cent. of carbon and hydrogen, from which it appears to contain about 16 per cent. of oxygen.

I had also fortunately made the following experiments with the view of obtaining, if possible, any solid constituents the oil might contain:—

1. A portion of lavender oil was placed in a distilling flask sealed to a receiver, the arrangement was exhausted by a Sprengel pump till the pressure in the apparatus was equivalent to less than one inch of mercury, and then hermetically closed. The receiver was well cooled and the oil distilled at as low a temperature as possible until only one fourth remained; the residue had the consistence of a syrup and was of a pale colour, but gave no sign of crystallizing after standing for a month, nor did it do so on cooling by means of freezing mixtures.

2. Small portions of the oil of lavender and of one of the higher boiling fractions were cooled with a mixture of solid carbon dioxide and ether. They became exceedingly viscid, but gave no signs of crystallizing, even when minute fragments of camphor were added to them. It is difficult to believe, after these experiments, that the oil contains any notable quantity of crystalline constituents.

From the independent experiments of M. Bruylants and myself it seems that the English and foreign oils differ very decidedly in the amounts of terpene they contain; that in each case it is a terpene yielding a crystallizable hydrochloride which is present; and that probably neither of the oils contains much crystalline constituent, but that both, and this applies particularly to the English oil, are chiefly composed of one or more liquid oxygenated bodies, which there is reason to believe yield camphor on oxidation, and which appear to undergo some degree of change during distillation. The statement in the books that lavender oil contains a hydrocarbon boiling at 200° to 210° C. is doubtless incorrect, as Dr. Morris's analysis shows that the distillate collected at near that temperature contains a large amount of oxygen. The further study of the oxygenated constituents will probably be most conveniently conducted with the English oil, as in that it is mixed with less hydrocarbon than in the foreign product.

In conclusion, I can only regret that I have not a more complete account of this matter to bring before the members of the Conference.

The President, having proposed a vote of thanks to Mr. Shenstone, which was carried unanimously,

Mr. Jackson asked if Mr. Shenstone had examined the optical properties of the terpene from French and English oils before assuming that they were the same.

Mr. Shenstone said that he did not assume that they were the same. He had not examined the optical properties, though he had intended doing so, because his material was unfortunately destroyed before he arrived at that stage.

The next paper read was on—

Terpin Hydrate; its Preparation and Crystallography.

BY R. H. PARKER.

This subject was brought under my notice by a sample of crystals of unknown composition, many of them remarkably well formed, found by my friend, Mr. W. Adams, of Shrewsbury, in a jar of "Furniture Oil," some of which had been sent to a customer who complained that it scratched the furniture; another bottle, carefully strained, was sent out, but it also come back in about a month with a note stating that it contained "bits of glass." The stock jar on examination was found to contain a considerable quantity of the crystals in question. The exact formula from which the furniture oil was made could not be referred to with certainty; it was probably made from one consisting chiefly of linseed oil, turpentine, butter of antimony and methylated spirit. A sample made according to this formula, however, has given no crystals during four years.

An examination of the substance proved it to be entirely volatile, and its elementary composition was soon found to be limited to C, H and O. When searching for nitrogen by heating with soda-lime, the production of a highly aromatic camphoraceous odour was observed. Further information as to the nature of the substance was sought by ultimate analysis. Several well-formed colourless crystals, evidently very pure, were selected, carefully wiped and powdered. ·1878 gram gave ·1995 H_2O and ·4375 CO_2; ·1787 gave ·1897 H_2O and ·4163 CO_2. Having observed its relation to ordinary solvents, a search among bodies approaching this composition suggested that the substance in question was terpin hydrate. On comparison, a specimen of that substance was found to possess the same crystalline form and produced the same peculiar odour when heated with soda-lime. The percentage of carbon found was too high, probably due to the specimen not being absolutely pure. The following are the figures obtained:—

	1.	2.	$C_{10}H_{18}(OH)_2,H_2O$.
C. . . .	63·53	63·53	63·16
H. . . .	11·80	11.79	11·58

The attempt to produce the substance from the furniture oil having failed, the ordinary process was adopted, *i.e.*, a mixture of turpentine, nitric acid and alcohol. Processes are recorded by Wiggers, Deville, Berthollet, Tilden and others giving different proportions of ingredients and stating numerous conditions probably conducive to the formation of terpin hydrate, but neither

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* It is not, of course, certain that this substance had not been produced from other constituents of the oil during distillation. Its resemblance to the terpene obtained by M. Bruylants, however, inclines me to the belief that it was not so.

† Professor Letts, who has very kindly shown me some unpublished notes of experiments on lavender oil, has also observed this rise of boiling point under the influence of heat.

details the exact method of mixing the ingredients or states what conditions really assist its formation.

Strong nitric acid, as is well known, acts violently on turpentine and on alcohol, the products varying with the temperature and strength of the acid; the latter and the order of mixing are most important points to observe in the manufacture of terpin hydrate.

My first experiments were made with nitric acid, specific gravity 1·42; a mixture of five volumes of turpentine with two of methylated spirit was kept cool while two volumes of acid were stirred in; this was agitated occasionally for a few days, poured into a shallow dish and a little spirit added at intervals. A dark brown mixture resulted separating into two layers, but no crystals appeared during many months.

In the next series the action of the acid on the turpentine was encouraged by floating the spirit on the oil, and pouring the acid through a funnel-tube to form a third layer at the bottom of the vessel, in this case the strong acid was in direct contact with the turpentine. The temperature rose rapidly, and an explosive ebullition took place, much vapour was disengaged, and the spirit afterwards boiled quietly for some time. A deep red syrupy liquid resulted which showed no tendency to crystallize; it was very soluble in alcohol, the solution bearing considerable dilution with water.

The opposite line of action was next adopted, the acid was diluted with water and mixed with the spirit before adding the oil; this proved to be the correct process and crystals were invariably produced. Nitric acid of specific gravity 1·25 yielded most satisfactory results, when stronger than specific gravity 1·3, no terpin was formed.

Attention was now directed to the conditions most favourable to the production of crystals. Insolation did not appear to influence the result to any important extent. Crystals appeared sooner and in greater abundance in shallow than in deep layers of liquid; the depth should be about a centimetre. Slight occasional rotation of the vessel hastened the appearance of crystals.

The production of *colourless* crystals was favoured by the use of rectified in the place of methylated spirit, of freshly distilled turpentine in preference to that which has been long exposed to air and by the exclusion of air from contact with the mixed ingredients. The latter condition was arrived at by placing a circle of glass, accurately fitting the vessel, so as to touch the surface of the liquid. The advantages gained by this precaution and by the use of rectified spirit were not sufficiently great to warrant their adoption in a manufacturing process. The exclusion of air seemed to favour the production of a larger proportion of crystals.

The following is the process finally adopted:—

Preparation of Terpin Hydrate.

Mix one volume of nitric acid, specific gravity 1·25, with one volume of methylated spirit, cool, place the mixture in a shallow glass dish and float upon it two volumes of oil of turpentine, rotate the vessel occasionally, and in three or four days crystals appear, allow to remain undisturbed for about fourteen days, collect the crystals on muslin, wash with cold water, drain, and dry by exposure to air, re-crystallize, if necessary, from slightly diluted alcohol.

The two layers soon acquire a straw tint, the lower being darker, the colour gradually deepens and after a few weeks becomes deep red. The depth of colour is much less when contact with air is prevented. Most of the terpin hydrate is deposited in the first fortnight. The total produce does not often exceed one-third of the weight of the turpentine taken. When little or no more terpin is produced, the lower layer appears to consist of a mixture of nitric acid and alcohol saturated with terpin and containing a small proportion of the upper layer in solution; this floats when the mixture is diluted with water, while the terpin crystallizes out. The upper layer has a pleasant aromatic odour, decomposes on boiling, but in a current of steam most of it passes over, the distillate being nearly colourless while the residue is very dark red, thick, and heavier than water. The successive portions of distillate varied in specific gravity at 17° C. as follows:—

No. 1	0·896
No. 2	0·900
No. 3	0·910
No. 4	0·921

In odour, the last is similar to but more rank than the first, there is no resemblance either to that of terpinol or the original terpene.

In another experiment, after the terpin had been deposited, the acid layer (*a*) and oily layer (*b*) were separated.

A fresh quantity of turpentine was floated on the acid layer (*a*) and an average crop of crystals was obtained; the upper layer was again replaced by fresh turpentine from which also a large proportion of terpin was in due time produced.

The oily layer (*b*) was floated on a fresh mixture of acid and alcohol, but no crystals appeared for six weeks, and after that time, only a small quantity.

The results I have obtained agree, in the main, with Tilden's (*Journ. Chem. Soc.*, 1878), except that I find the use of a weaker acid necessary, and omit the subsequent additions of methylated spirit.

The theory given by that author accounting for the production of terpin by the intermediate formation of a compound of terpinol with ethyl nitrate,

$$C_{10}H_{16} + C_2H_5OH + NO_2OH = C_{10}H_{18}O \left\{ \begin{matrix} OC_2H_5 \\ NO_2 \end{matrix} \right.$$

$$C_{10}H_{18}O \left\{ \begin{matrix} OC_2H_5 \\ NO_2 \end{matrix} \right. + 2H_2O = C_{10}H_{18} \left\{ \begin{matrix} OH \\ OH \end{matrix} \right. + C_2H_5OH + NO_2OH$$

is satisfactory, except that it does not explain the fact that only one-third of the terpene is hydrated.

Crystallography of Terpin Hydrate.

The crystals which are first produced in the preparation of this substance are often extremely well formed, and if simply wiped, avoiding washing with water, the faces are remarkably brilliant. They consequently afford an excellent opportunity for the study of its crystalline form, which is a combination of the rhombic octahedron and prism in which the faces of the former are dominant; those of the latter are often much reduced but never disappear. Fig. 1 illustrates the average form, which,

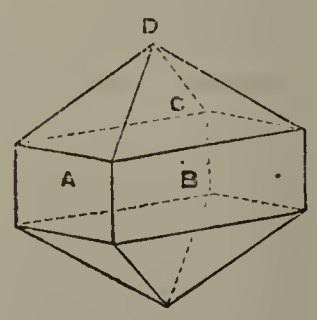

Fig. 1.

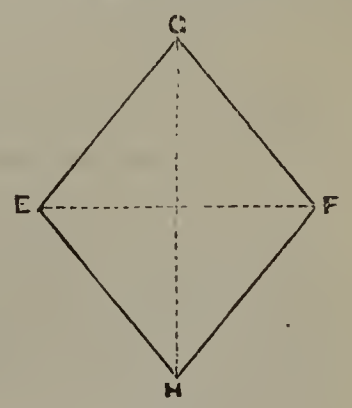

Fig. 2.

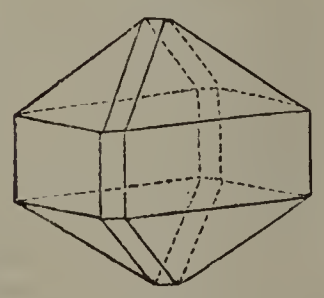

Fig. 3.

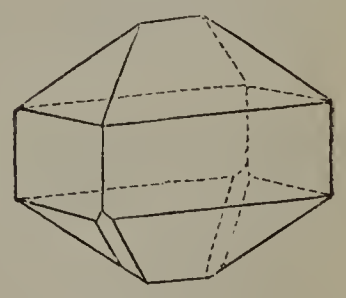

Fig. 4.

however, is not often completely developed; the prism faces are frequently much extended, producing a more or less elongated prism, while they are sometimes reduced to quite a narrow face, forming a nearly closed octahedron. Fig. 2 illustrates the horizontal section. Occasionally the

macrodiagonal edge (G and H, Fig. 2) is replaced by a narrow face which is shown in Fig. 3, carried round the complete crystal. These faces are but slightly developed and in the crystal as first formed they are seen on the pyramid in a few cases and never on the prism. After recrystallization from alcohol, the macrodiagonal face may be observed on the prism, more frequently on the pyramid, and occasionally on both.

The most important modification of form to which the crystal is subject consists in decrements from one or more faces of the prism and pyramid; in fact nearly all are more or less modified in this way, the prism becoming more or less flattened, and the solid angle at the apex being reduced to a horizontal edge forming a dome instead of a pyramid. Fig. 4, which illustrates these changes and also the appearance of the macrodiagonal face on the lower side, may be taken as the typical form of terpin hydrate crystals. When produced from alcoholic solution, even slowly, the tendency is to form elongated prisms and needles, but the terminal pyramid is always evident. The brachydiagonal edge (E and F, Fig. 2) does not appear in any case replaced by a face.

The measurements of the opposite angles of prism and pyramid were found, as expected, identical; the macrodiagonal face was found inclined equally to the adjacent faces of the prism.

After a large number of measurements, three of the most perfect and brilliant crystals were selected for final examination with the reflecting goniometer. Five different observations of the solid angle at the apex gave a mean of 105° 6′; nine different observations of the inclination of the pyramid face to that of the prism gave a mean of 127° 33′; a slight error in excess is evident—

$$105° 6' + 2(127° 33') = 360° 12'$$

a closer approximation would therefore be 105° 2′ and 127° 29′. Numerous observations of the prism faces gave as the best results—

macrodiagonal angle E G F = 77° 45′
brachydiagonal angle G E H = 102° 15′

From these measurements the relative lengths of the axes are calculated—

E F	:	G H	:	vertical axis =
0·8007	:	1	:	0·4951

This result, however, does not quite agree with the parameters given by previous observers (*vide Phil. Mag.*, 1879, p. 132).

Maskeleyne	0·8082 : 1 : 0·4788
Arzruni	0·8072 : 1 : 0·4764

Specific Gravity of Terpin Hydrate.

This appears to vary slightly, the average being 1·09, relative to distilled water at 17·5° C.

Solubility of Terpin Hydrate.

At 20° C. it requires for solution 13 parts of alcohol, specific gravity, ·825; about 350 parts of distilled water; its solubility in alcohol is much increased by heat; boiling water dissolves about 3 per cent. It is slightly soluble in chloroform, carbon bisulphide, ether and benzol, scarcely in turpentine.

This substance well illustrates the conventional character of the term solubility, which I have before pointed out when referring to that of salicin (*Pharm. Journ.* [3], xii., p. 378). A simultaneous series of experiments was made on the solubility of terpin in alcohol and in water, all being maintained at a constant temperature of 20° C. for over forty-eight hours. One part of terpin dissolved in 11 volumes of alcohol with the aid of slight heat did not crystallize, while 1 in 13 without heat did not entirely dissolve, although repeatedly agitated. One part of terpin in 240 volumes of water dissolved by heat, gave a single tiny crystal at the end of forty-eight hours, while 1 in 300 without heat left a considerable amount undissolved. The solubility cannot be taken by the method of evaporation, because terpin is volatile at a dry heat much below 100° C.

The odour observed on heating terpin with lime suggested distillation of such a mixture. Terpin mixed with four or five parts of lime was slowly distilled over a column of lime heated to low redness. A liquid yellowish oil was obtained, having a very powerful aromatic camphoraceous odour, in some degree resembling that of yarrow and cajeput, and yet distinct from them. Sometimes much terpin distils apparently unchanged and solidifies in the condenser. I have not yet arrived at a process by which terpin can be completely converted into this oil, so as to obtain a sufficient quantity for complete examination. It seems, however, probable that terpin hydrate may be made to yield several aromatic oils by the action of dehydrating substances under suitable conditions.

The President said the first feeling on the part of most members on listening to this paper would be one of astonishment that so much science should be made to flow from a bottle of furniture polish; and the second would be that a great deal depended on who drew the cork. He was proud to think that in this instance it had been drawn by an old pupil of his own, and pharmacy should be proud to think that a gentleman engaged as an assistant behind a retail counter could find time and possess the ability to carry out an investigation of this kind. He would propose a vote of thanks to Mr. Parker, who he hoped would continue his researches.

A vote of thanks having been agreed to,

Mr. Shenstone said the most interesting point about this communication was the origin of the terpin in the bottle of furniture polish, which Mr. Parker seemed to think was a mixture of linseed oil, spirit of turpentine and butter of antimony. There was a general impression that nothing answered very well for making terpin hydrate excepting nitric acid diluted with alcohol, and now it seemed possible that further investigation might introduce a new body capable of producing terpin hydrate from turpentine, which would be interesting and important, as it might render the explanation of the reaction suggested by Dr. Tilden insufficient.

Professor Tichborne said it was his duty some years ago to prepare a considerable amount of terpin hydrate, when he discovered a body called colophonic hydrate, which in its properties bore a considerable resemblance to terpin hydrate, but it differed considerably in one important point, inasmuch as it gave a number of beautiful colour reactions with hydrochloric and sulphuric acid, which terpin hydrate did not. It was a product formed by oxidization from what was known as resin spirit, and there was no doubt a close relation between it and terpin hydrate. In preparing terpin hydrate his experience was that if it were crystallized from fairly strong alcohol, a mass of fine crystals was obtained, but if a solution of 1 part of water to 2 of ordinary spirits of wine were allowed to evaporate spontaneously very magnificent crystals were formed, sometimes approaching ½ inch in length.

Mr. Giles asked how Mr. Parker arrived at the conclusion that the furniture oil had been composed of the ingredients he had mentioned. Was it by analysis or by communication of the formula?

Mr. Parker said he was unable to arrive at the exact formula from which the polish was made; it occurred in a pharmacy where it was not frequently in demand, being made sometimes from one formula and sometimes from another; the one containing turpentine and butter of antimony seemed to him the most likely one and he made some from that, but no terpin hydrate was formed. It seemed as if the formation of terpin hydrate required a peculiar condition in the mixture; whether a liquid isomer was formed he could not say, for the original sample which was sent out produced another crop of crystals within a month; whereas the specimen he made would not produce crystals under any conditions.

Mr. Shenstone asked if there was any possibility of the polish being made from a formula containing nitric acid.

Mr. PARKER said it was very unlikely; the preparation of furniture oil with turpentine and butter of antimony was very common, but he did not think any nitric acid would be used knowingly. Professor Tichborne's remarks on colophonic hydrate were interesting, but to his mind the production of beautiful crystals of terpin hydrate seemed due not so much to the solvent as to the presence of other bodies with it. In the first purification of these crystals by means of methylated spirit, the presence of the other bodies was very evident, and in that case only did he obtain a similar crystal. When recrystallized, either from rectified or proof spirit, he found the crystals always exhibited a tendency to assume the form of long prisms or needles.

The next paper read was—

ON A NEW METHOD OF MAKING A VOLUMETRIC SOLUTION FOR DETERMINING THE HARDNESS OF WATER.

BY C. R. C. TICHBORNE, F.I.C.,

Analyst, Co. Longford, etc.

It is rather curious to observe that in spite of our constant familiarity with the determination of the hardness in waters, we have never been able to improve, or modify, to any extent the original process of Dr. Clarke, invented nearly half a century ago. We may go even further, and state that we have never been able to throw doubt upon his original investigations and that they stand as he left them. Any so-called modifications are merely nominal, and have been made to suit the modern centesimal mode of expression. The most important proposals have been made in connection with the making of the soap solution and the standard calcium solution used for titration. A few of these modifications are, without doubt, improvements; but none of them touch in the slightest degree the principle of the process. Thus, in making the soap solution, Dr. Clarke used a soap made from animal fats (curd soap), and it has been respectively proposed to use a soft soap made from olive oil, lead soap (*emp. plumbi*), or a soda soap of olive oil (Castile soap). All these three last proposals are undoubtedly better than the original curd soap, as proposed by Dr. Clarke, owing to the very simple fact that the fatty acids in the last three mainly consist of oleic acid, and that the oleates are less prone to separate in cold weather than the corresponding fatty bodies found in the curd soap.

As regards standard hard waters, I had adopted for some time the well-known modification of dissolving an equivalent quantity of powdered selenite. This process leaves nothing to be desired as regards the construction of a calcium solution. It is simple and gives most accurate results, providing there are no crystals of celestine in the selenite,—an experienced geologist will instantly detect them by his eye.

Having premised thus far, it might be asked, Why seek to change, or improve upon the process? Experience shows that the most troublesome part of the method consists in making the soap solution. Soaps are too indefinite in composition to admit of making a reliable solution by merely weighing out a given quantity and dissolving it in a proper quantity of spirit. Assuming that a soap of a definite fatty acid could be always obtained, we find the amount of water to differ so considerably as to render a titration necessary; a titration too, which presents some considerable trouble.

My first idea was that if we took oleic acid and neutralized it with a standard solution of sodium hydrate, the latter base would represent the calcium salts, constituting hardness, equivalent for equivalent. I found, however, in practice that this is not quite so simple a matter as it would appear at first sight, but at the same time it is quite easy to construct a soap solution upon the basis of the soda hydrate consumed by the fatty acid.

The quantivalence of oleic acid may be, and has been, variously viewed. It is generally viewed as a monobasic acid. As acid salts, however, are known, it may with equal propriety be viewed as a bibasic acid; whilst, as will be seen further on, there is every reason to think that tetrabasic compounds of the alkalies exist.

Five cubic centimetres of commercial oleic acid were dissolved in 50 c.c. of spirit of wine, and 1 drop of a ·5 per cent. solution of phenol-phthalein added. A volumetric solution of soda was then run in until a pink indication was obtained. After repeating this experiment two or three times the reaction was found to be not only well defined, but very constant. If litmus were used, not only is it difficult to determine the point of saturation, owing to the gradual transition of colours, but owing to the permanent dissociation of a trace of the oleates when in solution (to which the litmus is amenable), the reagent is not suitable to the experiments detailed. The 5 c.c. of oleic acid exactly worked off at 15·5 of the normal solution of soda of the British Pharmacopœia, which represents 0·62 grams of sodium hydrate. Theory for the oleate having the formula $M'C_{18}H_{33}O_2$ would require 0·6 of hydrate of sodium, assuming the 5 c.c. of acid weigh 4·575 grams.

At this stage of the experiments a curious observation was made when water was substituted for the alcohol. The 15·5 of volumetric solution when added, as I have previously stated, gave a permanent liquid product of a faint pink tinge, showing that the point of neutrality had just been passed. A drop more of the volumetric solution developed a magenta colour, which was permanent as long as the solution was left at this point of saturation. A further equivalent of sodium hydrate was then run in (viz., 15·5 c.c.), when it gradually became colourless again, and at 7·75 c.c. began to pectize; the solution at this stage represented about the consistency of thick mucilage. When the full equivalent was present the solution became a solid jelly. The vessel in which it was obtained might be inverted with impunity. The pectized oleates seem to be permanent and definite compounds. From their behaviour when thrown into alcohol they appear to be hydrated compounds and are perfect colloids. If we push the action further, other compounds are formed which are much more soluble. There seems to be a wonderful analogy between silicic and oleic acid, and the technical application of silicates in soap-making appears to have been one of those chance discoveries which are in advance of scientific knowledge. As I intend to reserve this part of the subject for a separate communication, I have only to consider on the present occasion the practical bearings of these observations.

The measurers of the hardness in water are really the fatty acids, and it is almost immaterial whether we use the monobasic or dibasic salt above mentioned. In these remarks, we retain the old formula of oleic acid, but it is evident that the whole subject requires revision. We find by experiment that very little difference will be obtained, but that as the pectized salt seems to lather more freely, and as the solution seems more permanent I prefer it.* We, however, always depend upon the sharp reaction obtained on adding the soda until the pink solution is developed with phenol-phthalein. This point always represents the proportion of NaHO as equalling pure $C_{18}H_{34}O_2$.

The following is the process:—

As already mentioned, 5 c.c. of oleic acid are measured with a pipette and 50 c.c. spirit added to it in a beaker; 2 drops of phenol-phthalein solution are also added, and immediately a volumetric solution of soda $\left(\frac{NaHO}{1000} -\right)$ is run in until a pink indication is produced. This must

* This remark is not strictly true. I have found specimens of some oleic acids which do not work well, and do not readily pectize, and wherever there is any doubt about the results it is safer to merely add the exact proportion to neutralize the acid, as indicated by phenol-phthalein.

be done accurately, as the success of the process depends upon this measurement. If the gelatinous salt is required, another quantity of soda is then run in. The oleate of soda is then made up to the required measure by the addition of a mixture of equal parts of rectified spirit and distilled water. Each 15·5 c.c. of soda used in the first saturation equals 820 c.c. of volumetric solution of soap.

Thus— $$\frac{n \times 820}{15{\cdot}5} = x$$

n being the number of c.c. of soda solution which the oleic acid works off at, it is to be made up x. Such a solution makes a lather exactly on the original scale of Clarke, and it becomes unnecessary to titrate such a solution against a calcium solution, the soda solution being quite as definite and reliable as a calcium solution. Again, although different oleic acids might differ in purity, such a condition of things introduces no error, as the volumetric soap solution is made up on the saturating power of the acid employed, which alone determines the strength. Oleic acid obtained from the candle manufacturers, and a pure sample from Messrs. Hopkin and Williams, gave me exactly the same results in this respect, although they differed very much in their pectizing properties. The 15·5 c.c. of soda required to saturate 5 c.c. of acid always neutralized in my experiments; but I am not prepared to say that this would be generally the case, and it is difficult to make in different hands a pipette always delivering separately the same amount of an oily fluid like oleic acid, therefore I proceed on the above basis of calculation.

The above process gives a solution 32° c.c. of which when operating on 100 c.c. of water represent 16° of hardness per gallon by Clarke's scale.

The advantages claimed are that the soap solution may be made in five minutes,—requires no titration against a standard water,—and is more permanent than those made from ordinary soaps.

The President moved a vote of thanks to Professor Tichborne, which was carried unanimously. He said this method seemed a practical improvement inasmuch as it started with something quite definite, like soda, instead of something indefinite, like soap or commercial oleic acid. He would ask Professor Tichborne whether a solution made in that way really did keep better,—whether he had observed it for any length of time. It seemed natural for a soap solution when exposed to the air to split up, more or less rapidly, into an alkaline body and an acid oleate, the less soluble oleate being apparently more durable.

Mr. Ekin said he understood Professor Tichborne to say that when he added more alkali to what was a perfectly clear solution of soap he got a pectinized form. Was it not possible that the soap was insoluble in a solution of alkali, and that the pectinization was thus accounted for? The kind of soap he had found keep best was Pear's transparent; when dissolved in spirit it keep very satisfactorily. The method proposed for making a soap solution was perhaps about the most convenient, as it was a ready process that was always at hand. The great difficulty with Clarke's process had always been the trouble with the different kinds of soap.

Professor Quinlan said he had often had occasion to make use of Clarke's test, and he could bear witness to the extreme trouble of making up the soap solution. This paper seemed to afford a method for readily making up a definite compound which would be very easy to use.

Mr. Jackson asked if Professor Tichborne had used any other indicator than phenol phthalein, litmus, for instance, and compared results, to see if they were always the same.

Mr. Naylor said the method he adopted was to purify the commercial oleic acid by freezing, then to dissolve in that oleic acid some freshly precipitated oxide of lead, and decompose the lead compound in the usual way. He did not quite see why this oleate of soda should be more definite made as Professor Tichborne proposed than by any other method, provided the oleic acid were purified to begin with.

Professor Tichborne, in reply to the question put by the President, said there was no doubt that this solution did keep better than those of ordinary soaps. Even Castile soap, which was supposed to be very definite, sometimes contained a great mixture. He did not claim that this solution would keep perfectly; like all soap solutions, after being kept some time, there was a kind of silky crystalline appearance upon it, which it was impossible to avoid; but it was quite different to what occurred when a soap was used which contained a large proportion of stearic and palmitic acids. Sometimes there was a deposit in the bottle, which would prevent any reliable work being done. One of his reasons for thinking that the gelatinous body which pectized with the two equivalents of soda was a definite compound was based on the fact that if it were placed in a dialyser it acted very like a definite compound. He was not prepared at present to say that it was, but he thought this much more likely than that it was insoluble in caustic soda; because if another equivalent were added still more soluble compounds were obtained; the gelatinous appearance passed away, and by the addition of another equivalent of sodium a perfectly soluble compound was produced. The use of litmus as a test was not applicable; in the first place it was extremely difficult with such a thing as that to watch the reaction, the transition of litmus was so gradual. His experience of litmus was that it was about the worst indicator that could be used. He had observed with students, that what one called the point of neutrality with litmus was quite a different thing from what another did. The indication of litmus was a transition from the deep alkaline blue, through all the shades of violet to bright red with a strongly acid solution. Phenol phthalein was perfectly definite; take any oleic acid you liked, it was always sharp and there was not the slightest variation in the result. Another advantage was that with it a neutral solution was perfectly colourless, like water, but directly a minute quantity of acid was added it developed a strong magenta colour. Lastly, he did not claim that the oleate of soda made by this process possessed any peculiar properties, or was more definite than any other solution; he only put it forward as a convenient mode of manipulating the volumetric solution of oleate of soda, without having to go to the soap, which involved two processes, making the volumetric solution first with soap, and then regulating it.

The next paper read was—

Notes on Brazilian Drugs.

BY CHARLES SYMES.

The drugs which I desire to bring before the notice of this meeting are three in number, and, although practically unknown in this country, I trust they will not be found altogether devoid of interest. They have been received under the respective names of "Resin de Angico," "Almasça" and "Guassatunga." The two former are products of the district of Maranham in the north of Brazil (the locality from whence we obtain the finest copaiba balsam), the latter comes from the south and was obtained in the neighbourhood of Porto Alagre.

Resin de Angico.—This is not a resin but a gum, of a deep brownish-red colour, translucent, and breaking with a bright shining fracture. It occurs in pieces of from 1 to 3 ounces in weight, some of which have portions of bark attached to them. In the 'Formulario ou Gui Medica' of Chirnoviz, it is mentioned as the product of *Acacia Angico*, and is said to be good for chest complaints; the same tree yielding an astringent bark. Mr. Holmes has

identified it with a specimen in the Museum of the Pharmaceutical Society, and has kindly furnished me with the small piece of bark which accompanies the specimen of gum. The pieces are very tough, but when broken up and dried at 212° for some hours it loses 12 per cent. of moisture and can then be readily reduced to fine powder. When added to twice its weight of water it forms a thick semisolid magma, and when this quantity of water is increased to eight times its weight, less than one-half dissolves, forming a reddish-brown mucilage with a slightly acid reaction; the remaining jelly-like mass becoming liquid on the addition of a little caustic alkali, thus resembling tragacanth more nearly than it does gum arabic. It dissolves in proof spirit almost as completely as it does in water. The aqueous solution is rendered turbid by the addition of rectified spirit in excess, also by solution of oxalate of ammonia; it is not affected, however, by solutions of perchloride of iron, borax or acetate of lead. As regards its medicinal properties the only remark which accompanied it was similar to that of Chirnoviz,—"usa-se nas molestias do peito," useful in chest complaints, which probably means that it is demulcent; but whether it possesses any special virtues in this respect, or whether it is in any way superior to the remedies of this kind already in use here, remains to be proved. A physician to one of the Liverpool hospitals has promised to determine this point.

Almasca.—This substance, received in sausage-shaped masses of about 12 inches in length and 2 to 3 inches in diameter and covered with dried leaves, is evidently a species of elemi, but it differs in appearance and in some of its characters from the elemi of commerce, from the Brazilian elemi of the Hanbury collection and also from that of Dr. Pereira at Bloomsbury Square. Except that it is more recent, and therefore much softer, it more nearly resembles the Brazilian elemi of Martin's collection, and Mr. Holmes is of opinion that it is produced by the same species, probably by *Icica heptophylla.* It comes from the same district as gum angico, but without any particulars of its use there. The term almasça indicates mastic, but from this it differs very materially. It is a soft grey looking resin, with whitish crystalline masses diffused more or less frequently through it, and possesses an aromatic, fragrant and somewhat penetrating odour. Chloroform, ether and absolute alcohol dissolve it without the application of heat; it also dissolves in boiling spirits of wine, specific gravity ·0838; but at ordinary temperatures this breaks it up into a thick milky looking liquid, dissolving only 65 per cent., the remaining portion corresponding in its various characters with the substance known as *amyrin.* This may be purified by solution in boiling rectified spirit, from which on cooling, it separates in white crystalline masses.

Flückiger and Hanbury examined Manila elemi and found it to contain 20 per cent. only of this substance. They also obtained by distillation as much as 10 per cent. of a volatile oil which, examined with Wild's polaristrobometer, was found to be strongly dextrogyrate; whilst a sample of oil of elemi examined by H. St.-Claire Deville was found to be strongly levogyrate. I have distilled a portion of this substance and have only obtained 7·3 per cent. of a colourless volatile oil, with an odour reminding one of fennel, and which corresponds with that of the 'Pharmacographia' in that it is soluble in bisulphide of carbon and gives a deep orange colour with strong sulphuric acid, but on careful examination I found it to be *optically inactive.*

Elemi is at present little used in medicine, but it seems to possess properties worth the attention of the medical profession and pharmacists.

Guassatunga.—On a recent vist to the south of Brazil, Mr. Joseph Hallewell found in use there a popular native remedy for snake-bite in the form of an alcoholic tincture of a golden yellow colour, put up in small bottles, with a label in Portuguese as follows:—"Para mordedeura de cobras e outros animaes veneno. Tomas-se uma gota em uma colher d'agua de 10 em 10 minutos de 2 ou de 4 em 4 horas conforme a gravidade de caso, nas criancas metade ou menos. Sobra as mordedura couserva-se panos embebidos em 4 colheres d'agua com 10 gotas." Thus in English,—"For the bites of snakes and other venomous reptiles. One drop to be taken in a spoonful of water every ten minutes for two or four hours according to the severity of the case, for children half or less. Mix 10 drops in 4 spoonfuls of water, in this soak a cloth and apply to the bite or wound."

Assuming this to be a remedy of some amount of activity, Mr. Hallewell procured a small quantity of casca de guassatunga, the bark from which this tincture is prepared. It is the produce of a tree inhabiting the borders of Uruguay and occurs in pieces of from 2 to 4 inches in length, from 1 to 2 inches in width and $\frac{1}{16}$ in thickness, hard and breaking with a short non-fibrous fracture. It is of a fawn colour with a greenish-brown tint diffused irregularly over it, paler on the outer than on the inner surface and possesses a slightly bitter taste.

Treated with ether it yields a bright green resinous substance; with alcohol a golden yellow tincture is obtained, and the marc infused in water yields a brown liquid which on evaporation produces a dark brown extract. Altogether this treatment removes 24 per cent. of its original weight. The tincture, treated with the usual reagents, gave characteristic indications of the presence of an alkaloid and I have, in fact, been able to separate a small quantity of such a body in a crystalline form but only sufficient for examination with the microscope. On the receipt of a further supply I hope by the aid of medical friends to determine more exactly its physiological action and also to make a further investigation of it chemically.

The President said it was obviously desirable in the interest of pharmacy that they should have early information respecting drugs likely to be imported, not merely such statements as could be obtained from price lists, but information concerning their chemical, physical, and botanical properties, such as Mr. Symes had given them in his paper and for which he was entitled to a vote of thanks.

A vote of thanks having been passed,

Mr. Atkins said he thought the line of procedure taken by Dr. Symes was well worth further consideration. If it was found that the natives of distant lands resorted to certain remedies, without any knowledge of the philosophy of their action, it was then very desirable to investigate the properties of those remedies scientifically. A large amount of work might have been already done, but it was in the rough and followed what might be called the rule of thumb. A short time ago he received from a friend, who had gone to the Congo, a plant which was said to have a very specific action as a styptic, and he intended to hand it over to another friend and have it examined. There was a goodly number of generally accepted remedies, which came to them originally only on report as being used for certain diseases by the natives of distant lands, and if the matter were pursued further the number might be considerably increased.

Mr. Groves asked if Dr. Symes had experimented with these drugs on any of the lower animals; but he presumed he would require a licence before operating even on a mouse. It appeared to him to be a great obstacle to science that a simple thing like this which Dr. Symes had been kind enough to bring forward could not be dilated on satisfactorily in consequence of the action of the anti-vivisectionists. A dose of this medicine could not be given to a mouse, although it might do the mouse good, in consequence of the existence of the Act of Parliament.

Mr. Groves, as senior Vice-President, then took the chair while the President read his paper entitled—

Half an Hour with a Few Sheets of the New Pharmacopœia of the United States of America.

BY PROFESSOR ATTFIELD, F.R.S.

In a letter, dated New York, August 4, 1882, sent to the writer, as President of the British Pharmaceutical Conference, by Professor P. W. Bedford, President of the American Pharmaceutical Association, the following paragraph occurs:—"I recently forwarded to you proof sheets from the corrected plates of the first ninety-six pages of the text of the forthcoming Pharmacopœia of the United States. I now have the pleasure of sending the succeeding forty-eight pages. These are all that are, as yet, in presentable condition. They will serve to show yourself and friends of the British Pharmaceutical Conference that it will be a work worthy of the labour bestowed upon it. It is the only copy that has gone outside our Committee."

By way of showing our honorary member our appreciation of his compliment, and in order to give British pharmacists some information respecting this new Pharmacopœia, the following descriptive remarks are offered.

In point of size of page this sixth decennial revision of the United States Pharmacopœia exceeds its predecessor. That was a foolscap octavo, this is a full octavo. The leading names of the preparations are given in larger, plainer, black letters, the names of the components of the formulas are also given in thick type, the quantity of each component now being printed not only in words, which, by the way, are in italics, but, in addition, in figures.

The former division into the two great classes of "Materia Medica" and "Preparations," the latter divided into over sixty sub-classes, is no longer maintained. The work is now, therefore, in uniformity with the one simple alphabetical arrangement of the British Pharmacopœia.

The Chemical Nomenclature.—Four or five years before the fifth decennial revision, that of 1870, was published, I very strongly advocated that system of chemical nomenclature under which names of salts of potash, soda, ammonia, baryta, lime, magnesia, etc., become names of salts of potassium, sodium, ammonium, barium, calcium, magnesium, etc. The system was adopted in the 1870 pharmacopœia (issued in 1872), "to place the work in accord with the progress of chemical science." In acknowledging my endeavours for its introduction, the President of the National Convention presented me with the first copy of the Pharmacopœia sent to this country. I may be pardoned for expressing my gratification at finding that the system is retained in this 1882 revision, showing that the nomenclature has been found to be practicable and serviceable in the medicine and pharmacy of a great English-speaking people.

Weights and Measures.—The Convention for the fifth revision (1870) resolved on the abandonment of measures of capacity, but the Revising Committee were alarmed at the amount of time, labour, and cost involved in the application of the resolution to the whole of the Pharmacopœia, and objected that the execution of such directions entailed the employment of an untried system. The old wine gallon and troy pound with their confusing divisions were, therefore, retained. These are now swept away, and "*parts*," by weight, substituted. Thus:—

Extractum Colocynthidis Compositum.

Compound Extract of Colocynth.

Extract of colocynth, *sixteen parts*	16
Aloes, *fifty parts*	50
Cardamom, in No. 60 powder, *six parts*	6
Resin of scammony, in fine powder, *fourteen parts*	14
Soap, dried and in coarse powder, *fourteen parts*	14
Alcohol, *ten parts*	10

Then follow very full directions for preparation.

In cases in which some notice of volume as well as weight is required the metric decimal system is employed. Thus:—

Extractum Ergotæ Fluidum.

Fluid Extract of Ergot.

Ergot, recently ground and in No. 60 powder, *one hundred grammes*	100
Diluted hydrochloric acid, *six grammes*	6
Alcohol,	
Water, each, *a sufficient quantity*,	
To make one hundred cubic centimeters	100

New Preparations.—The first seven pages of the Pharmacopœia (exclusive of prefatory matter, which has not yet come to hand) are almost wholly occupied with a new class of compounds termed Abstracts—Abstracts of aconite, belladonna, conium, digitalis, hyoscyamus, ignatia, jalap, nux vomica, podophyllum, senega, valerian. Thus:—

Abstractum Jalapæ.

Abstract of Jalap.

Jalap, in No. 40 powder, *two hundred parts*	200
Sugar of milk, recently dried and in fine powder,	
Alcohol, each, *a sufficient quantity*,	
To make *one hundred parts*	100

Moisten the jalap with *one hundred* (100) *parts* of alcohol, and pack firmly in a cylindrical percolator; then add enough alcohol to saturate the powder, and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed, gradually adding alcohol, until the jalap is exhausted. Reserve the first *one hundred and seventy* (170) *parts* of the percolate, distil off the alcohol from the remainder, and mix the residue with the reserved portion. Place the mixture in an evaporating dish, and, having added *fifty* (50) *parts* of sugar of milk, cover it with a piece of thin muslin gauze, and set aside in a warm place where the temperature will not rise above 50° C. (122° F.), until the mixture is dry. Lastly, having added enough sugar of milk to make the mixture weigh *one hundred* (100) *parts*, reduce it to a fine, uniform powder.

Preserve the preparation in a well-stopped bottle.

These "abstracts" are, in short, alcoholic extracts, or, in other words, the dried residue of evaporated tinctures, mixed with sugar of milk and rubbed to powder, and of such a strength that one part represents two parts of the original root, leaf, etc. The exhaustion of the aconite is aided by tartaric acid, the hemlock by hydrochloric acid. For the ignatia and nux vomica the alcohol (having a strength of 91 per cent. by weight) is slightly diluted. Otherwise the directions for their preparation, respectively, are almost identical.

Other additions, to go no farther than the letter A, are acidum boricum, acidum hydrobromicum dilutum, acidum oleicum, acidum salicylicum, æther aceticus, aluminii hydras, ammonii phosphas, amyl nitris, amylum iodatum, apomorphinæ hydrochloras, auri et sodii chloridum.

Aconitia is omitted, atropina retained. The root only of aconite is employed. Alcohol amylicum is omitted. Aloe Socotrina is the only variety recognized. Both varieties of aralia are dismissed. Acidum muriaticum has become acidum hydrochloricum, aqua chlorinii is now aqua chlori, sulphurets are now sulphides.

The doses of drugs were not given in 1870; they are not given in the present Pharmacopœia.

Temperatures are now stated in Centigrade degrees, with the Fahrenheit equivalents in brackets.

Characters, tests, and descriptions generally are given much more fully than before. No chemical symbols were given in the last edition; chemical formulæ, both on the old and new systems, are now given as in the British Pharmacopœia, and the molecular weight is appended to each formula.

Remedies which have come into use during the past decade find due place. Thus a cursory glance at these

one hundred and forty-four pages reveal cinchonidine sulphate, codeine, one simple elixir—of orange,—eucalyptus leaves, fluid extract of guarana, extract of malt, fluid extract of pilocarpus.

Critical remarks would, at present, be out of place, but Professor Bedford's statement would seem to be thoroughly well founded, namely, that much labour has been worthily bestowed on this sixth decennial revision of the Pharmacopœia of the United States of America.

The CHAIRMAN said that the hearty thanks of the meeting were due to Professor Bedford for his considerate courtesy in forwarding an early copy of an interesting portion of the new United States Pharmacopœia. The members were also very grateful to Professor Attfield for his paper thereon, though, as he said, they must wait until the work was published in its complete form before criticizing it. Then an evening or two might very profitably be devoted to its discussion. At present he could only say that this new Pharmacopœia seemed to be distinctly in advance of its predecessor.

Professor REDWOOD said the general feeling must be one of gratitude to the President for bringing this subject under the notice of the Conference. As had been already said, this was not the occasion to enter on anything like a critical notice of even what had been thus briefly brought under their notice; when the work came into their hands it would be very greatly appreciated no doubt, especially as a movement was now being made towards the production of a new edition of the British Pharmacopœia, and the opportunity of observing the results of the investigations made on the other side of the Atlantic, and the conclusions arrived at by the able pharmacists there, would be very valuable to those whose duty it would be to prepare a similar work for use in this country. One remark of a general character he might make, viz., that in this country, and especially amongst those who at present had the legal authority to prepare and issue the Pharmacopœia—the Medical Council—there was a far greater amount of conservatism than existed on the other side of the Atlantic; and he had no reason to anticipate that in the new edition of the British Pharmacopœia changes so considerable as those which appeared in the new edition of the American work would be introduced. One principle acted upon in this country was that it was not justifiable to introduce into the Pharmacopœia new preparations which had not been proved in medical practice. Such preparations as "abstracts," to which Professor Attfield had alluded, were an entirely new class, and the principle which had been hitherto acted upon by the Medical Council was that any such preparations ought to come into general use before they were introduced into the Pharmacopœia. There were certain changes alluded to which had been previously adopted, and there were others which he had not the slightest doubt would be adopted in any subsequent edition, such, for instance, as the nomenclature, which he believed was entirely approved of by the Committee of the Medical Council who had charge of the matter. With regard to the weights and measures, that was a point with reference to which he had no doubt some change would be made, possibly in the direction indicated in the American edition, which he himself advocated some years ago, when he worked it out and submitted it to the Pharmaceutical Society, ordering parts by weight. Whether that would be the method adopted he could not anticipate, but it seemed to him under existing circumstances by far the most rational mode of treating the subject. The adoption of a new system of weights and measures, new to medical men in this country and to those pharmacists whose studies had not been in the scientific line, would lead to a great deal of opposition if attempted hastily. In the present edition of the Pharmacopœia metric weights and measures were recognized where they could be applied in processes of volumetric testing, but even the Americans had hesitated to adopt the system entirely. On the whole he should say the plan they had adopted of having parts by weight was the one which would be most likely to meet with general approval. He had only had a hasty glance at these sheets, and did not know that there was anything else he could add. He was quite sure that when the complete work came into their hands it would be very fairly and liberally examined and whatever was thought to be really beneficial, and not too much of the character of untried novelties, would receive full and fair consideration.

The Conference then adjourned until the following morning.

(*To be continued.*)

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

PRESIDENTIAL ADDRESS TO THE CHEMICAL SECTION.

BY PROFESSOR G. D. LIVEING, M.A., F.R.S., F.C.S.

If I were asked in what direction chemical science had of late been making the most important advances, I should reply that it was in the attempt to place the dynamics of chemistry on a satisfactory basis, to render an account of the various phenomena of chemical action on the same mechanical principles as are acknowledged to be true in other branches of physics. I cannot say that chemistry can yet be reckoned amongst what are called the exact sciences, that the result of bringing together given matters under given circumstances can yet be deduced in more than a few special cases by mere mathematical processes from mechanical principles, but that some noteworthy advances have in recent years been made, which seem to bring such a solution of chemical problems more nearly within our reach.

To show how large a gap in our ideas of chemical dynamics has been bridged over within the last quarter of a century, I will quote the words of one of the largest minded philosophers of his time, who was one of the earliest promoters of this Association, and its President in 1841: Whewell, in a new and much altered edition of his 'Philosophy of the Inductive Sciences,' published in 1858, says:—"Since Newton's time the use of the word *attraction*, as expressing the cause of the union of the chemical elements of bodies, has been familiarly continued, and has no doubt been accompanied in the minds of many persons with an obscure notion that chemical attraction is in some way a kind of mechanical attraction of the particles of bodies. Yet the doctrine that *chemical* 'attraction' and *mechanical* attraction are forces of the same kind has never, so far as I am aware, been worked out into a system of chemical theory; nor even applied with any distinctness as an explanation of any particular chemical phenomena. Any such attempt, indeed, could only tend to bring more clearly into view the entire inadequacy of such a mode of explanation. For the leading phenomena of chemistry are all of such a nature, that no mechanical combination can serve to express them without an immense accumulation of additional hypotheses." ('History of Scientific Ideas,' ii., p. 13.) And further on he says:—"We must consider the power which produces chemical combination as a peculiar principle, a special relation of the elements not rightly expressed in mathematical terms." (*Ib.*, p. 14).

The influence by which our ideas have gone round so as to be now the very opposite of those of the illustrious thinker whom I have just quoted, so that we should ridicule the thought of looking for an explanation of chemical action on any but mechanical principles, is undoubtedly the progress which has been made in other branches of molecular physics. The indestructibility of matter has long been a formula familiar to chemists, but that the conservation of energy should be as universally true, even in regard to chemical actions, has only in

recent years been fully recognized. This is certainly no new principle, it was developed mathematically generations ago; but the realization that it is anything more than an abstraction, that it is the keynote of every rational explanation of physical phenomena, has been the foundation of recent progress in physical science; and if all energy be one, there can be but one code of dynamical laws which must apply to chemistry as well as to all other branches of physics. The development of the mechanical theory of heat, and of the molecular theories which have grown up in consequence of it, have done much to set our minds free from preconceived notions, and to induce us to build chemical theories on something more than unverified conjectures.

But how far can we say that mechanical principles are actually recognized as the true basis of rational chemistry? So far as I know no chemist denies that it is so, and yet how little do our text-books, even the most recent and the most highly reputed, show the predominance of this idea! How very small a portion of such books is taken up with it, how much seems utterly to ignore it or to be couched in language antagonistic to it! We still find chemical combinations described as if they were statical phenomena, and expressions used which imply that two perfectly elastic bodies can, by their mutual action alone, bring each other into fixed relative positions. We still find change of valency described as a suppression of "bonds of affinity," as if a suppression of forces were the usual course of nature, or as if it were possible that the same two forces, acting at the same place and in the same direction, should at one time neutralize one another, and at another time not neutralize one another. We still find saturated compounds spoken of as if the stability of a compound were independent of circumstances, and chemical combination no function of temperature and pressure. Beginners are sometimes helped by the invention of intermediate reactions in explanation of final results, without any reference to the dynamical conditions of the problem, without any consideration whether the fancied intermediate reactions imply a winding-up or a running-down of energy. In fact our long familiar chemical equations represent only the conservation of matter, and to keep always in mind the mechanical conditions of a reaction is as difficult to some of us as it is to think in a foreign language. Moreover, we still find in many of our text-books the old statical notion of chemical combination stereotyped in pictures of molecules. I do not, of course, mean to accuse the distinguished inventors of graphic formulæ of meaning to depict molecules, for I believe that they would agree with me in thinking that these diagrams do not any more nearly represent actual molecules than they represent the solar system; but unfortunately we cannot prevent beginners from regarding them as pictures, and moulding their ideas upon them. They present something easily grasped by the infant mind, and schoolmasters are fond of them, but only those who have each year to combat a fresh crop of misconceptions, and false mechanical notions engendered by them, can be aware how much they hinder, I will not say the advance, but the spread of real chemical science. If it be true that the illustrations of an artist like the late Hablot Browne give to our conceptions of the characters of a story a more definite and permanent, though perhaps a much modified form of what the author of the story intended to portray, it is equally true that the illustrations by which some, even great names amongst us, have tried to make us fancy that we had a true conception of some natural process, have become so fixed in our minds as to prevent our realizing the true meaning of nature.

What, then, is the progress which I think has been made in physical chemistry? In the first place, notwithstanding the slowness with which new ideas replace old familiar images, the molecular theories developed by Clausius, Clerk-Maxwell, and Boltzmann, and by Sir W. Thomson, have been long enough before the world to have greatly loosened the hold upon our minds of many old notions. The rigid, unbreakable, impenetrable atoms of the Epicurean philosophy, made familiar to us by Lucretius, always presented difficulties which were only perhaps exceeded by those of the elastic atmospheres with which modern philosophers fancied them to be surrounded; but now the vortex theory, whether we think it probable or not, at least gives us a standing ground for the assertion that the supposed impenetrability of matter, and the curious compound of nucleus and atmosphere which had been invented to account for elasticity, are not necessary assumptions.

The kinetic theory of gases has analysed for us the different motions of the molecules in a mass of matter, and has facilitated the conception of the part which heat plays in chemical action. Hence we have had of late several attempts to reduce to a form susceptible of mathematical calculation the problems of chemistry. Most of these attempts have proceeded on the well-known mechanical principle that the change of *vis viva* of a system, in passing from an initial to a final configuration, is independent of the intermediate stages through which it may have passed, provided the external conditions are unaltered; and on the principle of the dissipation of energy, that is to say, on the condition that the state of the system, if it be a stable one, must be such that the energy run down in reaching it is a maximum. These principles have been applied successfully to the solution of some particular cases of the equilibrium between a mixture of chemicals by Willard Gibbs, Berthelot, and others. By the first mentioned principle all consideration of the intermediate stages by which the final result is reached is avoided. Quite recently Lemoinne has attacked the same problem on another principle. His principle is that of an equilibrium of antagonistic reactions in a mixture of materials, a mobile equilibrium, such as we are now familar with, dependent on compensating effects; but he does not seem able to solve the problem in any great number of cases. In fact, the difficulty does not now lie so much in expressing mathematically the conditions of the problem, as in the defect of knowledge which depends upon experiment. And it is just in this that I think the outlook most hopeful. In some cases the patient work of weighing, measuring, and comparing, which is necessary to make our theoretic speculations of any substantial value, has been already done for us. The publication, three years since, of Berthelot's 'Essay on Chemical Mechanics,' has given us, in a collected form, a large quantity of data of the first importance, and now I am glad to say that the long labours of another worker in the same field, Thomsen of Copenhagen, are in course of publication in a handy form. I think these two investigators have done more than anyone else of late years towards making it possible to give chemistry the rank of an exact science. But besides the data which they have supplied to us, there are others which are yet wanting. For instance, almost every equation of chemical equilibrium involves an expression depending on the specific heat of the materials. At present we do not know enough of the law of specific heats to be able to give in most cases a probable value to these expressions, but these and other data of the kind do not seem out of our reach, and we may hope that the same ingenuity and patience which has gained for us so much firm ground in thermal chemistry will extend it to the uncertain spots where we have yet no solid foundation.

Further, the laws of dissociation, so ably investigated by Deville, have taught us that the force called chemical affinity, by which we suppose the atoms of unlike matters are held together in a compound molecule, follows precisely the same laws of the force as cohesion by which particles of a similar kind are united in molecules. We have long known that the molecules of sulphur vapour are broken up into simpler molecules by elevation of temperature and condense again when the temperature is reduced. Other elementary substances behave

in a similar way. We have within the last two or three years learnt that iodine is in part dissociated by a high temperature from molecules consisting of two chemical atoms into molecules consisting of only one such atom, and the same is true of chlorine and bromine. That some such change must occur in iodine was inferred as long ago as 1864 by the younger Mitscherlich. He argued that iodine is a compound body from the fact that it shows two spectra, one similar in character to those of metallic oxides and the other similar to the spectra of metals, and from the analogy in the behaviour of iodine to a metallic oxide in giving the one spectrum at one temperature and the other at a higher temperature: "from this," he says, "it would follow that iodine at ordinary temperatures and iodine at the temperature of a hydrogen flame must be considered as two different compounds, because the spectrum of iodine formed at ordinary temperatures" (that is, the absorption spectrum of iodine vapour) "is different from that produced in a hydrogen flame." Also "that bromine, though it gives no flame spectrum, gives one spectrum by absorption and another by the electric spark, and must therefore in its ordinary state be regarded as a compound." Also that "the spectra formed by the flames of selenium, tellurium, and phosphorus, and those of sulphur and nitrogen given by feeble electric discharges, all have the character of the iodine flame spectrum, and these metalloids would therefore, if the above expressed supposition with regard to iodine be confirmed, also be compound bodies." (*Phil. Mag.*, 1864, p. 188.) Since the paper from which the foregoing extract is taken was published, not only the metalloids but many metals have been found to give complicated spectra at one temperature and much simpler spectra at higher temperatures. Such are the channelled spectra of sodium and potassium, first described by Roscoe and Schuster, the channelled spectra of silver, bismuth, and other metals described by Lockyer and Roberts, and the ultra-violet channelled spectrum of tin recently photographed by Dewar and myself. Mitscherlich's hypothesis gives us a rational explanation of such multiple spectra produced by the same substance, and it has been accepted, in one form or another, by all spectroscopists since he wrote. Nevertheless, the existence of multiple spectra cannot be taken as a proof of allotropic modification unless the possibility of a chemical combination be excluded. The channelled spectrum which magnesium gives in hydrogen was mistaken by more than one observer for that of some modification of the simple metal, until it was shown that magnesium in nitrogen or other gases does not give it if no hydrogen is present, and that its persistence in hydrogen at high temperatures depends, as does the permanence of chemical combinations, on the pressure of the gas. If, however, homogeneous molecules are dissociated by heat, so also are heterogeneous molecules, formed, as we say by chemical combination, split up by elevation of temperature, to unite again on cooling, or when the pressure is increased within certain limits. Nor is there any essential difference in character between a chemical compound and an element, beyond that of facility of decomposition. If we could not so easily resolve them into their constituents, and were to disregard the difference of their spectra, no one would suppose ammonia to be differently constituted from potassium, or cyanogen from chlorine. Indeed, chemists have long been in the habit of considering the union of two atoms in a molecule of ordinary hydrogen or chlorine as a species of chemical combination; but when we find that the combinations of particles of the same kind are as definite as those of particles of different kinds, and that they are both subject to precisely the same mechanical laws, we are hardly justified in regarding the forces by which they are produced as essentially different. To get rid of a gratuitous hypothesis in chemistry must be a great gain.

But it may be asked, Why stop here? Why may not the chemical elements be further broken up by still higher temperatures? *A priori* and from analogy such a supposition is extremely probable. The notion that there is but one elementary kind of matter is at least as old as Thales, and underlies Prout's hypothesis that the atomic weights of our elements are all multiples of that of hydrogen. This famous hypothesis has gone up and down in the scale of credibility many times during the present century, About seventeen years ago the publication of Stas' new determinations of combining weights, carried out on a scale never before attempted, and with all the refinements which the growth of our knowledge could suggest, was thought to have given it its deathblow. But a reaction has set in since that time. The periodic recurrence of the properties of elements with regular additions to the atomic weights, like octaves in a musical scale, put forcibly before us by Mendelejeff, makes it difficult not to think that there is a simple relation between the atomic weights, though there may be causes producing slight perturbations of such a relation. Quite recently a fresh revision of the combining weights has been made, on the other side of the Atlantic, by Professor F. W. Clarke. He has collected all the determinations made by different observers, and after rejecting such as from defective methods were untrustworthy, has applied to the remainder such corrections as newer experiences have suggested, and then deduced from the corrected numbers the most probable values by the methods of the theory of errors. Professor Clarke has done a piece of work of the highest utility, for which chemists must be grateful; nevertheless, he has not carried the revision so far as it might be carried. He has, to begin with, rightly separated the several sets of observations, and deduced the most probable number from each set by itself, but in combining the various sets for the final determination of the numbers adopted, he has treated the results obtained by different methods, as if they were a set of observations all presumably of equal value, so that the most probable numbers could be deduced by the method of least squares. He has not attempted any discussion of the different methods with a view to an estimate of the relative values of the results obtained by them, nor made any difference between the values of the figures deduced from operations on the large scale employed by Stas and those arrived at on the small scale of other observers. Any sort of handicapping of methods is no doubt a very difficult and delicate operation, and requires more than the judgment of an Admiral Rous, but without it the question whether the numbers adopted are the best obtainable will always be an open one. It is, however, a very noteworthy fact, that in almost every case the numbers deduced from Stas' experiments, taken by themselves, coincide very closely indeed with the most probable numbers derived by the method of least squares from the whole of the recorded estimates. On the whole, Professor Clarke concludes that Prout's hypothesis, as modified by Dumas, is still an open question, that is to say, his final numbers differ from whole multiples of a common unit by quantities which lie within the limits of errors of observation and experiment.

Let us turn again to the evidence afforded by our most powerful instrument for inspecting the inner constitution of matter, the spectroscope. A few years ago Mr. Lockyer supposed that the coincidence of rays emitted by different chemical elements, particularly when those rays were developed in the spark of a powerful induction coil and in the high temperatures of the sun and stars, gave evidence of a common element in the composition in the metals which produced the coincident rays. Such an argument could not be drawn from the coincidences unless they were exact, and the identity of the lines could only be tested by means of spectroscopes of great resolving power. By the use of the well-known Rutherford gratings, Young, in America, had found that most of the solar lines which had been ascribed to two metals were in reality double, and Dewar and I, working on the

terrestrial elements in the electric arc, had found the actual coincidences to be very few indeed. These observations, even with Rutherford gratings, were delicate enough; but quite recently M. Fievez, of the Brussels Observatory, has brought to bear on this question, a spectroscope of unexampled power. By combining two of the Astronomer Royal's highly dispersive half prisms with a Rutherford grating of 17,296 lines to the inch, he has obtained a dispersion quadruple that of Thollon's combination of prisms. Bringing this to bear on the sun he has mapped the solar spectrum from a little below C. to somewhere above F., on a scale one-third greater than that of Vogel's map, and has not only confirmed the work of Young, Dewar, and myself, but has resolved some lines which were not divisible by such dispersive power as we had at command. This result cannot fail to shake our belief, if we have any, in the existence of any common constituent of the chemical elements; but it does not touch the evidence which the spectroscope affords us, that many of our elements, in the state in which we know them, must have a very complex molecular structure. I cannot illustrate this point better than by the spectra of two of our commonest elements, magnesium and iron. We have good reason to think the molecule of magnesium to be as simple as that of any chemical element, and we find its spectrum to be one of the simplest, consisting of a series of triplets which repeat each other in a regular way and are probably harmonically related, and of a comparatively small number of single lines, of which also some may be harmonics. The spectrum of iron, on the other hand, presents thousands of lines distributed irregularly through the whole length, not only of the visible, but of the ultra-violet region. Make what allowance you please for unknown harmonic relations and for lines which are not reversible and may not be directly due to vibrations of the molecules, we still have an immense number of vibrations, so that we can hardly conceive any single molecule to be capable of all of them, and are almost driven to ascribe them to a mixture of differing molecules, though we have as yet no independent evidence of this, and no satisfactory proof that any of this mixture are of the same kind as occur in other elements.

M. Fievez's combination is a great advance in resolving power, but Professor Rowland, of the John Hopkins University, promises us gratings not only exceeding Rutherford's both in dimensions and accuracy of ruling, but ruled upon curved surfaces, so as to dispense with the use of telescopes and avoid all variations in focussing the different orders of spectra. His instruments, if they come up to the promise he holds out, will enable us to solve many questions which are difficult to answer with our present appliances.

But to return to the chemical elements: the spectroscope has in the last few years revealed to us several new metals. I will not venture to say how many, for when several new metals more or less closely allied are discovered at the same time, the process of sifting out their differences is necessarily a slow one. We cannot tell yet whether any of them are to fill gaps in Mendelejeff's table, and so add strength to the conviction that there is a natural relation between the atomic weights and the chemical characters of our elementary substances, or whether they will add to the embarrassment in which we already find ourselves with regard to the relations of the cerium group of metals; whether we may welcome them as the supporters of order or deprecate their coming as authors of confusion. Granting that the chemical characters of an element are connected with its atomic weight, we have, however, no right to assume them to be dependent on that factor alone. Why may there not be elements which, while they differ as little in atomic weight as do nickel and cobalt, are, on the other hand, so similar to one another in all characters that their chemical separation is a matter of the greatest difficulty, and their difference only distinguishable by the spectroscope? The spectra may be thought to suggest so much, and how shall we decide the question? At any rate the complications of the spectroscopic problem can only be unravelled by the united efforts of the chemists and physicists, and by the exercise of extreme caution.

I cannot dismiss the subject of chemical dynamics without alluding to the ingenious theory by which the President of the Association has proposed to account for the conservation of solar energy. He supposes planetary space to be pervaded by an atmosphere which, except where it is condensed by the attraction of the sun and planets, is in a highly attenuated state. The sun and planets communicate some of their own motion of rotation to the atmosphere condensed about them, and he supposes that in this way an action like that of a blowing fan is set up, by which the equatorial part of the sun's atmosphere acquires such a velocity as to stream out to distances beyond the earth's orbit, while an equal quantity of gas is drawn in at the poles to maintain equilibrium. The gases thus driven to a distance in planetary space will, of course, be enormously expanded and highly attenuated, and in this state Dr. Siemens thinks that such of them as are compound may be decomposed by absorbing the solar radiation, and thus the kinetic energy of the sun's rays be converted into the potential energy of chemical separation. The separated elements, or partial compounds, will in the circulation produced by the fanlike action of the solar rotation be carried back to the polar regions of the sun as fuel to maintain his temperature by condensation and recombination. I will not discuss the mechanical part of this theory further than to remark that the fanlike action can only be carried on at the expense of the energy of the sun's rotation, which must, in consequence, be continually diminishing, and must in time become too slow to produce any sensible projection of the atmosphere into distant regions of planetary space. As to the chemical side of the theory, Dr. Siemens supposes the gases which pervade the planetary space to be not only of the same kind as the components of our own atmosphere, which on the kinetic theory of gases must diffuse through that space, but also such gases as are not found in our air, but are found occluded in meteorites which may be supposed to have acquired them in their previous wanderings. Amongst these he specially mentions hydrocarbons which form the self-luminous part of most comets. It is to these gases, together with aqueous vapour and carbonic acid, that he ascribes the principal part in the conservation of solar energy. That compound gases at the extremely low pressure of the planetary space are decomposed by solar radiation is not inconsistent with the laws of dissociation, for it is quite possible that some compounds may be decomposed at ordinary temperatures by mere reduction of pressure, and the radiation absorbed will be the more effective because it will directly affect the vibratory motion within the molecule, and may well produce chemical decomposition before it can, when the free path of the molecules is so much increased by the attenuation of the gas, assume the form of an increased temperature. Dr. Siemens, moreover, adduces a remarkable experiment in confirmation of this supposition. We know, too, the power which our atmosphere, and especially the water vapour in it, has of absorbing the infra-red rays, and that amongst the Fraunhofer lines some of the strongest groups are due to aqueous vapour; and the capital observation made by the spectroscopic observers at the last total eclipse, that the group of lines known as "B," which is one of those produced by aqueous vapour, is greatly strengthened when the sun's light passes by the edge of the moon and so through the lunar atmosphere, may be taken as a confirmation of the theory that gases like our atmosphere are diffused through space and concentrated about the planets. But if it be true that the compounds are decomposed by absorbing the sun's rays, we ought to find in our atmosphere the products of decomposition; we

ought to find in it free hydrogen, carbonic oxide, and acetylene or some other hydrocarbons. The hydrogen, from its small specific gravity, would not be concentrated in the lower regions of our atmosphere in the same proportions as the denser gases, but carbonic oxide and hydrocarbons could not fail to be detected in the air if they formed any sensible proportion of the gases in the planetary space. That a large portion of solar radiation is intercepted before it reaches the earth is no doubt true, for there are not only the dark bands which are increased by our atmosphere and may reasonably be attributed to the action of like gases pervading planetary space, but there is a continuous absorption of the ultraviolet spectrum beyond the line U, and Cornu has found that this absorption is not sensibly affected by our atmosphere so that the substance, whatever it be that produces it, may be an agent in the process imagined by Dr. Siemens, but cannot be the means of restoring to the sun any portion of his radiant energy which reaches our distance from him.

Dr. Siemens explains the self-luminous character of comets by the theory that the streams of meteoric stones of which they are supposed to consist bring from stellar space hydrocarbon and other gases occluded within them, and that in consequence of the rise of temperature due to the frictional resistance of such a divided mass moving with enormous velocity, aided by attractive condensation, the occluded gases will be driven out and burnt, the flame giving rise to the original light emitted by the nucleus. Now the spectrum of most comets shows only the principal bands of a Bunsen burner, and is therefore adequately explained by the flame of gas containing hydrocarbons such as have been found in meteorites; but Dr. Huggins has observed in the spectrum of more than one comet, not only hydrocarbon, but cyanogen bands; and, although carbon and nitrogen combine readily in the electric arc, a coal-gas flame in air shows no trace of the spectrum of cyanogen, and it would certainly put some strain on our credulity if it were asserted that cyanogen was one of the gases brought ready-formed by meteorites from stellar space. Dewar and I have, however, recently shown that if nitrogen already in combination, as, for instance, ammonia, be brought into a hydrocarbon flame, cyanogen is produced in sufficient amount to give in a photograph (though not so as to be directly visible) the characteristic spectrum of cyanogen as it appears in the comet. It is therefore no longer necessary to make any other supposition to account for the cyanogen bands in the spectra of comets, than that ammonia, or some such compound of nitrogen, is present as well as hydrocarbons in a state of ignition.

Quite recently Dr. Huggins has observed that the principal comet of this year has a spectrum of an entirely different character, but he is not yet able to say to what elements or compounds it is probably due. The notion that comets may bring us news of distant parts of stellar space, towards which our system is driving, where the atmosphere is not like ours—oxygen and nitrogen—but hydrogen and hydrocarbons, may fascinate the fancy, but the laws of occlusion oblige us to think that the meteorites have not merely wandered through an attenuated atmosphere of hydrogen and hydrocarbons, but have cooled in a much denser atmosphere of those substances, which we can only conceive as concentrated by the presence of a star or some large aggregation of matter. They may, perchance, have come from some nebulous mass, for Draper and Huggins tell us that in the great nebula in Orion hydrogen is dense enough and hot enough to show some of its characteristic lines, besides the F line which is seen in other nebulæ, and is the last to disappear by reduction of density, No comet on visiting our system a second time can repeat the exclusion of its occluded gases unless its store has been replenished in the interval, and it will be interesting to see, when Halley's comet next returns, whether it shines only by reflected light or gives us, like so many others, the banded spectrum of hydrocarbons.

Parliamentary and Law Proceedings.

Poisoning by Laudanum.

An inquest was held by Mr. Barstow, at the Prince of Wales Hotel, Halifax, on John Bates, aged fifty-six, who died on Sunday noon from an overdose of laudanum, It appeared the man had suffered much from sleeplessness, and on Saturday he went to Mr. Bancroft, chemist. Barum Top, and asked for two ounces of laudanum. Mr. Bancroft questioned him why he wanted so large a quantity, and he replied that it was to mix with some other things for a cough. Mr. Bancroft cautioned him about the use of it, telling him what was the dose for a cough. The man retired to bed early, and, his family being unaware that he had bought the laudanum, let him lie in bed until well into Sunday forenoon before going to see him. He was then found unconscious and breathing heavily. Mr. Gascoigne, surgeon, was fetched, and he, suspecting narcotic poisoning, searched the room, and found a bottle containing about half an ounce of laudanum wrapped in a newspaper and hid among some dresses in a drawer.

A verdict was returned of "Death from an overdose of laudanum, but whether taken to procure sleep or to destroy life there was no evidence to show."—*Leeds Mercury.*

Alleged Death from Lead Poisoning.

An inquest was held on August 29, at the Keighley Cottage Hospital, before Mr. T. P. Brown, touching the death of William Wilson Riley, forty-two, who, it was alleged, had died from lead poisoning. Mr. George Burr, Clerk to the Local Board, watched the case on behalf of that body. There were several members of the board also present.

Sarah Riley, the widow, deposed that her husband died on Saturday, the 26th inst., after being confined to his bed for a short time. He had had pretty good health, except being troubled with sick headache. He was in the Kildwich railway accident, about seven years ago, which made him rather nervous, and he had never seemed to recover from it. Her husband suffered from lead poisoning about two years ago, and she herself had had an attack of it.

Dr. William Dobie deposed to having twice seen deceased during his late illness, and found him to be suffering from symptoms of lead poisoning. He had made a *post-mortem* examination, in the presence of Dr. Eddison, Leeds, Dr. Jack and Messrs. Chaffers, Holman and Roberts, of Keighley. There were no marks of external injury, and the body showed the usual marks apparent after death. There was no dropsy. The body was wasted, but not extremely so. The left wrist presented an appearance of what is known as a "dropped" wrist. The brain was a little paler than usual, but otherwise healthy. The lungs were quite healthy, though there was an old standing of pleura covering them. The bag of the heart was quite natural; the heart somewhat enlarged. The stomach was natural. The appearances of death were not inconsistent with death from lead poisoning. The "dropped" wrist and the constricted condition of the large bowel especially pointed in that direction, but he would not dogmatically like to say that that was the cause of death. The proof would not be complete until a chemical analysis was made of the viscera.

In reply to the Foreman, witness said he did not find sufficient disease to cause death except from lead poisoning. Deceased visited him about two years ago, and then he was suffering for lead poisoning, At that time he advised him to discontinue using the water.

A Juror asked if he had come across many cases of lead poisoning.

Witness said he had reported sixty-four cases to the Local Board twelve months ago

By Mr. Burr: Those cases extended over several years.

By the Foreman: The lead was dissolved from the pipes by the action of the water. It was his opinion but for lead poisoning the deceased would have lived an average life.

By Mr. Burr: If the deceased's symptoms had not been known to him he should have inferred after he had made the *post-mortem* examination that lead poisoning had been the cause of death. He was not aware that deceased had been in the Kildwick railway accident.

The Coroner: We want three things before this inquest can be concluded. The viscera will have to be analysed, and samples of water must be taken from the tap in deceased's house and another out of the main before it entered the service-pipe to his house.

The inquest was adjourned for a month to allow the Coroner's instructions to be carried out.—*Leeds Mercury.*

Obituary.

ROBERT HOWDEN.

We have to announce with deep regret the death of this well-known pharmacist. He expired at 78, Gracechurch Street, City, just before midnight, on Thursday, August 31. Up to the commencement of his illness, only a week before, he was engaged in the full activities of business, when he was seized with an acute form of inflammation, from which he never rallied.

Mr. Howden was born in the City of London, January 18, 1822, and left school when fourteen years old, from which time, as far as general education was concerned, he was self-taught. His first regular employment was in some chemical works connected with a gas company, and the ability he there displayed led to the idea of his entering upon the medical profession, as a surgeon. Surgery, however, was abandoned for pharmacy, and about the age of nineteen he went to Mr. Henry Lamplough, then at Islington, since more widely known as the inventor of the Pyretic Saline. It was to improve his practical knowledge, rather than to pass through an apprenticeship, that the duties of the place were undertaken.

Subsequently he became an assistant to Mr. William Hooper, of Russell Street, Covent Garden. From thence he went to Mr. Winstanley (now Messrs. Corbyn), in the Poultry; learned practical chemistry in the laboratory, and in his lesiure hours became an adept in water-colour painting. Afterwards he became an assistant to Mr. Bartlett Hooper, of London Bridge. Thus he acquired a thorough insight into business details and was prepared to commence upon his own account with every prospect of success which personal experience could bestow.

In the spring of 1859 Mr. Howden established himself in Gracechurch Street, having chosen a centre of operation which was particularly adapted to his characteristic energy. It was an old establishment, in a decayed condition whether regarded as premises or connection. Mr. Howden boldly ventured on a somewhat hazardous undertaking; for the existing state of things was neither promising, nor free from grave anxiety. The business was at a low ebb: and the rent out of proportion to the receipts. From the first year affairs began to brighten, and at the expiration of five years the returns were doubled. These details are mentioned because they may interest others engaged in similar pursuits, and may prove an encouragement to those who are exposed to the struggles incident to commercial life.

As soon as Mr. Howden had gained an assured position he devoted himself with ardour to parochial and educational interests. He became overseer of the parish, and churchwarden of All Hallows, Lombard Street, and busied himself with church improvements and Christmas decorations.

Nothing could exceed the interest he took in the prosperity and internal organization of the Bishopsgate Ward Schools. He was one of the examining board, and ably seconded the efforts of the Rev. William Rogers, in whose parish the schools were situated. It was in a great measure owing to his personal energy and active interference that these schools were placed upon their present satisfactory basis.

Charitable institutions, connected with education, had for him a special attraction, and thus his voluntary labours were increased by his constant attention to the concerns of the Merchant Seamen's Orphan Asylum, at Snaresbrook, Essex. For the sake of the children, he arranged and conducted holiday excursions, and was one of their frequent lecturers. Amongst these discourses, which were illustrated by enlarged drawings executed by himself, those on Bread, Milk and its Preparations, Flashing Signals, as used in Military Service, and Paper, were keenly appreciated by his young audience.

To the literature of pharmacy Mr. Howden's chief contributions were two papers, one on "Cod Liver Oil," descriptive of its preparation at Lofoden, with commercial details; and a second on the "Pharmacy of the United States." His second communication to the members of our Society was a *résumé* of his own observations in America. To his not abundant literary work must be added a letter in the *Times* paper, commenting on the state of the pollution of the Thames. In this notice he attributed the loss of many of the ill-fated passengers in the *Princess Alice* to death by asphyxia, rather than to death by drowning.

Mr. Howden took no prominent part in the politics of the Pharmaceutical Society, and he steadily refused to aspire to a seat in council. In 1844 he obtained first class certificates in chemistry and botany; and became a member and pharmaceutical chemist in 1859. His reason for not accepting office was, that he held no one should enjoy the honour who was not prepared to give full time to the duties consequent on the position.

It will be conceded that he left himself scanty leisure, and that little was absorbed by a formidable array of responsibilities as executor and trustee, undertaken on behalf of friends who had implicit confidence in his financial skill.

Mr. Howden cultivated as an art the gift of conversation, and made it bear as much on business as on domestic intercourse. This, while it rendered him delightful as a companion, distinctly contributed to his advantage in business.

He died aged sixty, leaving a large circle to lament his loss. It would be difficult to find a more active man; a kinder or more unselfish one, would be impossible.

Correspondence.

Genealogical.

Sir,—The "Friends" are a long-suffering class, who do not need defence, but in justice to Mr. Hart's "Historic Quaker" it may be noted that he did not originate the principles which Mr. Hart most justly censures. As schoolboys we all made the acquaintance of his progenitors in Horace's first epistle—

"O cives, cives, quærenda pecunia primum est;
Virtus post nummos."

And again,—

"Rem,
Si possis recte, si non quocunque modo rem."

The curious may trace their genealogy still further back. Would that they could only be found in the "hoary chronicles" of the past.

Ryde. Henry H. Pollard.

Communications, Letters, etc., have been received from Messrs. Brown, Crompton, Woodland, Powell, Attfield, Hooper, Branson, Rowell, Schmidt, Robinson, Shenstone, Baker, Ignoramus, Ariovistus, Antiseptic, Jacque, Ferri, T. E. R., H.

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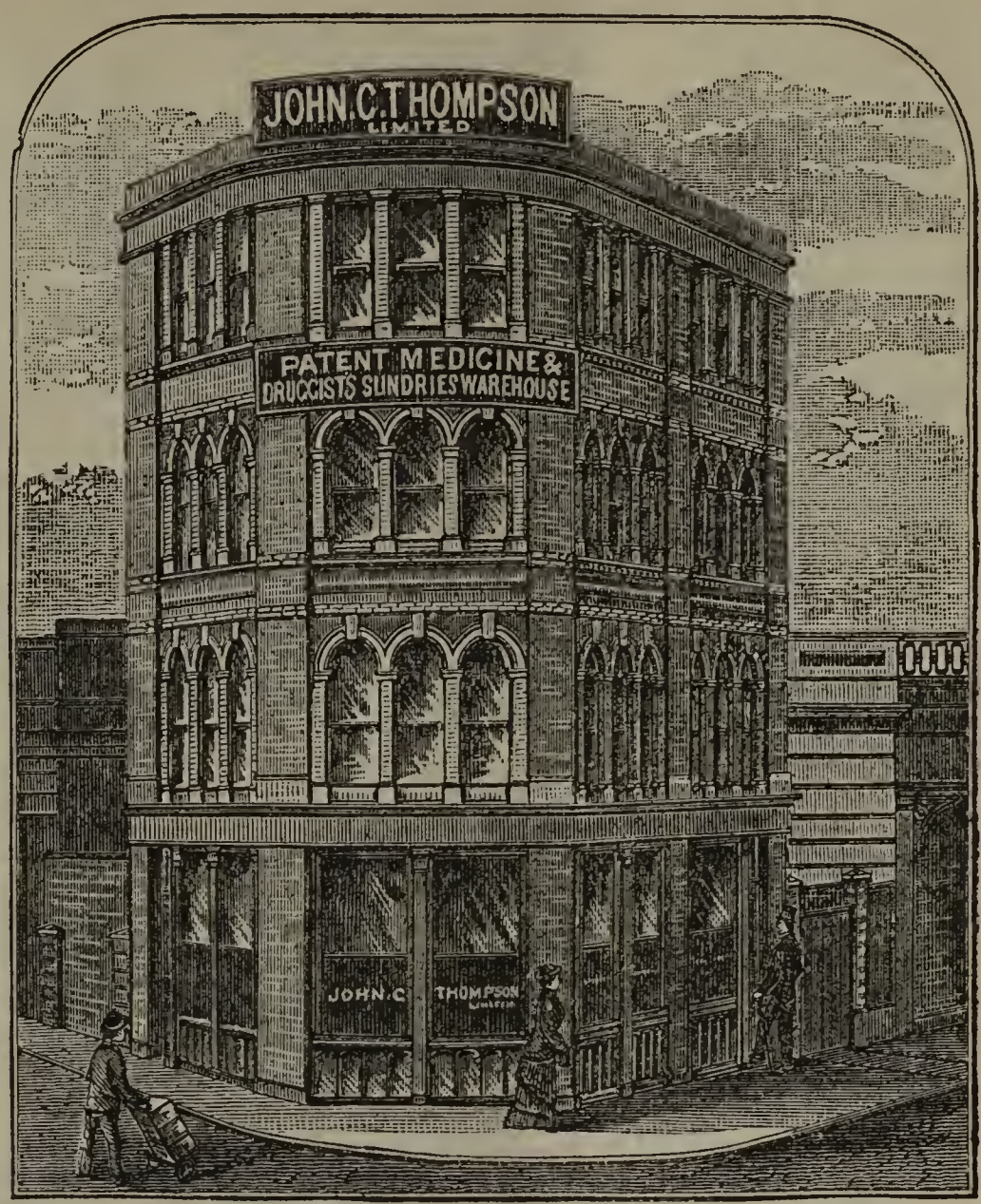

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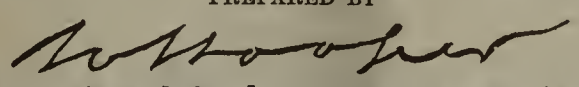

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King's College, London, Medical

DEPARTMENT.

The WINTER SESSION will be opened on Monday, October 2nd, at 4 p.m., when the Distribution of Prizes will take place, and an Address be given by the Right Hon. W. H. Smith, M.P.

A Special Course of Instruction has been established for the Preliminary Scientific Examination at the University of London, including Inorganic Chemistry, Practical Chemistry, Practical Biology, Experimental Physics, Zoology, and Botany.

The following Entrance Scholarships will be given in October next, viz.:—

Two on the Warneford Foundation of £75 each, for previous Education in General Literature and Science.

Two by the Clothworkers' Company—one of £100 and one of £50—for proficiency in Science only.

Two on the Sambrooke Foundation, viz.:—one of £60 and one of £40, for proficiency in Literature and Science.

During the ensuing Session there will be awarded five Medical Scholarships, viz.:—one of £80, one of £30, and three of £20, for professional efficiency; one for Chemistry of £40; one of £50 for resident students only; and two Sambrooke Registrarships of £50 each.

Endowed Prizes of the value of 65 guineas and College Prizes of the value of £60 are also awarded annually.

For Prospectuses and other information apply personally, or by post-card, to J. W. Cunningham, Esq., King's College, London; or to Professor Bentley, Dean of the Department.

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Guy's Hospital.—The Medical

SESSION commences on MONDAY, OCTOBER 2nd.

The Hospital now contains 695 beds, and includes wards for obstetric, opthalmic, and other special departments.

The Museum of Anatomy, Pathology, and Comparative Anatomy (Curator, Dr. Goodhart), contains 11,000 specimens, 4,500 drawings and diagrams, an unique collection of anatomical models, and a series of 600 models of skin diseases.

Appointments—The House Surgeons and House Physicians, the Obstetric Residents, Clinical Assistants, and Dressers, are selected from the students according to merit and without payment. There are also a large number of junior appointments, every part of the Hospital Practice being systematically employed for instruction.

Entrance Scholarships.—Open Scholarships of 125 guineas, in Classics, Mathematics, and Modern Languages. Open Scholarship, of 125 guineas, in Chemistry, Physics, Botany, and Zoology.

Prizes, &c.—Six Scholarships, varying in value from £10 to £50 each, for general proficiency in Medical Study. The Treasurer's Gold Medal in Medicine; the Treasurer's Gold Medal in Surgery; the Gurney Hoare Prize of £25, for Clinical Study; the Beaney Prize of 30 guineas for Pathology; The Sands Cox Scholarship of £15 per annum for three years for Physiology; the Michael Harris Prize of £10 for Anatomy.

For further information apply to the Dean, Dr. F. TAYLOR.

Guy's Hospital, London, S.E., July, 1882.

The London Hospital and Medical

College, Mile End, E.—The SESSION 1882-83 will commence on Monday, October 2, 1882. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other Hospital appointments are free. The resident appointments consist of Five House-Physiciancies, Five House-Surgeoncies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis. MUNRO SCOTT, Warden.

Faculty of Physicians and Surgeons

OF GLASGOW.

PRELIMINARY EXAMINATION IN GENERAL EDUCATION.

The following will be the periods of examination during Session 1882-3:—Friday, 20th October, 1882; Friday, 30th March; Friday, 29th June, and Friday, 7th September, 1883. On each occasion the examination will be continued on the succeeding day.

Lists of subjects and all necessary information may be had on application to the Secretary.

ALEXANDER DUNCAN, B.A., Secretary.

Faculty Hall, St. Vincent Street, Glasgow.
September, 1882.

University of Glasgow. — Session 1882—83.

The MEDICAL SESSION will be opened with an Introductory Discourse by Professor Gairdner, M.D., on TUESDAY, the 31st OCTOBER, 1882.

WINTER COURSES.

Zoology, 9 a.m.—Professor Young.
Clinical Medicine, 9 a.m.—Professor M'Call Anderson and Professor Gairdner.
Clinical Surgery, 9 a.m.—Professor George Buchanan and Professor Macleod.
Chemistry, 10 a.m.; and Chemical Laboratory, 9 a.m. to 4 p.m.—Professor Ferguson.
Anatomy: Senior, 11 a.m.; Junior, 2 p.m.; and Practical Anatomy, 9 a.m. to 4 p.m.—Professor Cleland, Dr. William Allen, and other Demonstrators.
Practice of Physic, 11 a.m.—Professor Gairdner.
Materia Medica, 12 noon, and Pharmaceutical Laboratory—Professor Charteris and Dr. Napier.
Institutes of Medicine, 12 noon, and Physiological Laboratory—Professor M'Kendrick, and Dr. J. M'Gregor Robertson, the Muirhead Demonstrator.
Surgery, 1 p.m.—Professor Macleod.
Midwifery, 4 p.m.—Professor Leishman.
Public Health—Professor Simpson.

SUMMER SESSION.

During the Summer Session the Courses of Botany (Professor Bailey Balfour), Practical Chemistry, Forensic Medicine (Professor Simpson) and Clinical Medicine and Clinical Surgery are given. There are also Courses of Anatomy (Lectures on Embryology), Practical Anatomy, Practical Zoology, Vegetable Histology, and Practical Botany, Practical Physiology (including Histology), Practical Materia Medica, Practice of Physic, Practical Pathological Histology, and Operative Surgery.

Lecturers.—Pathology—The Courses of the Pathologist of the Western Infirmary, Dr. Joseph Coats, and of the Pathologist of the Royal Infirmary are recognised.

Diseases of the Eye—Thomas Reid, M.D., Waltonian Lecturer (Summer Course).

Insanity—Dr. David Yellowlees, Royal Asylum, Gartnavel (Summer Course).

Western Infirmary.—This Hospital, near the University, contains 380 beds for Medical and Surgical patients, also Wards for Skin Diseases, and one for Diseases peculiar to Females.

Degrees.—Three Medical Degrees are conferred, viz.: Bachelor of Medicine (M.B.) and Master of Surgery (C.M.), which must be taken together, and Doctor of Medicine (M.D.); all of which are recognised by the Medical Act as qualifying for practice throughout the British dominions.

Cost of Education—The fee for each class is £3 3s, and the total minimum expenses for classes and graduation fees for M.B. and C.M. amount to about £90. The fee for M.D. is £15 8s.

Bursaries—Bursaries to the annual amount of about £1000 may be held by Students during their medical studies.

Full particulars connected with the course of education and examination required for the Degrees, and the Preliminary Examination required to be passed by Students before beginning medical study, will be found in the University Calendar (by post 3s.); or a syllabus of the regulations, fees, &c., may be obtained by applying to Mr. MOIR, Assistant Clerk of Senate.

St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

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FACULTY OF MEDICINE—SESSION 1882-83.

WINTER SESSION, commencing on Wednesday, November 1st.

Anatomy—Professor Struthers. 11 a.m. £3 3s.
Practical Anatomy and Demonstrations—Professor Struthers and Assistant. 9 to 4 and 9 a.m. £2 2s.
Chemistry—Professor Brazier. 3 p.m. £3 3s.
Institutes of Medicine—Professor Stirling. 2 p.m. £3 3s.
Surgery—Professor Pirrie. 10 a.m. £3 3s.
Practice of Medicine—Professor Smith-Shand. 11 a.m. £3 3s.
Midwifery and Diseases of Women and Children—Professor Stephenson. 4 p.m. £3 3s.
Medical Logic and Medical Jurisprudence—Professor Ogston. 9 a.m. £3 3s.
Materia Medica—Professor A. D. Davidson. 4 p.m. £3 3s.
Pathological Anatomy—(Sir Erasmus Wilson, Chair). Professor D. J. Hamilton. 3 p.m. £3 3s.
Practical Pathological Anatomy—Professor D. J. Hamilton. £3 3s.
Natural History—Professor Alleyne Nicholson. 2 p.m. £3 3s.

SUMMER SESSION, commencing on the first Monday of May.

Botany—Professor Jas. W. H. Trail. 8 a.m. £3 3s.
Practical Anatomy and Demonstrations—Professor Struthers and Assistant. 9 to 4 and 9 a.m. £2 2s.
Practical Chemistry—Professor Brazier. 10 a.m. £3 3s.
Natural History—Professor Alleyne Nicholson. 2 p.m. £3 3s.
Practical Natural History—Professor Alleyne Nicholson. 3 to 5 p.m. £2 2s.
Practical Physiology—Professor Stirling. 2 p.m. £3 3s.
Practical Pathological Anatomy—Professor D. J. Hamilton. £3 3s.
Practical Pharmacy—Professor A. D. Davidson and Assistant. 4 p.m. £2 2s.
Practical Midwifery and Gynecology and Clinical Diseases of Children—Professor Stephenson. 11 a.m. £2 2s.

The Anatomical Course in Summer includes instruction in Histology and in the use of the Microscope; and instruction in Osteology for beginners.

Matriculation Fee (including all dues) for the Winter and Summer Sessions, £1. For the Summer Session alone, 10s.

Pathological Demonstrations at the Hospital—in Winter, Dr. Rodger.

Practical Ophthalmology—Dr. A. D. Davidson, £1 1s.
Practical Toxicology—Dr. F. Ogston, jun., £1 1s.
Dental Surgery—in Summer, Dr. Williamson, £1 1s.

Royal Infirmary—Daily at noon. Perpetual Fee to Hospital Practice, £6; or first year, £3 10s.; second year, £3.

Clinical Medicine—Drs. Smith-Shand, Beveridge, and A. Fraser, £3 3s.

Clinical Surgery—Drs. A. Ogston, Will, and Garden, £3 3s.

General Dispensary and Lying-in and Vaccine Institution—Daily, 10 a.m. Eye Institution—Daily, 2.30 p.m.

Royal Lunatic Asylum—Physician, Dr. Jamieson.

The Regulations relative to the Registration of Students of Medicine, and the granting of Degrees in Medicine and Surgery, may be had of Professor Brazier, Secretary of the Faculty of Medicine.

Full information regarding the Classes and Degrees in the Faculties of Arts, Law, and Divinity, and in regard to Bursaries and Scholarships, will be found in the UNIVERSITY CALENDAR, published by A. King & Co., Printers to the University. By post, 2s. 3d.

THE MASON SCIENCE COLLEGE,

BIRMINGHAM.

SESSION—1882-83.

DEPARTMENT OF SCIENCE AND ARTS.

The SESSION will commence on Tuesday, the 3rd of October, 1882.

Students under sixteen years of age are required to pass a Preliminary examination.

All Departments of the College are open to both sexes on the same terms.

The Calendar, containing full information as to the Classes, Fees, &c., is published by Cornish Brothers, New Street, Birmingham, price 2s.; by post, 2s. 4d.

GEO. H. MORLEY, *Secretary.*

The Middlesex Hospital Medical

SCHOOL.—The WINTER SESSION 1882-83, will open on MONDAY, OCTOBER 2nd, at 3 p.m.; with an Introductory Address by R. W. Lyell, Esq. After the Lecture the Prizes awarded during the previous Winter and Summer Sessions will be distributed.

The ANNUAL DINNER of the past and present students and their friends will take place the same evening at St. James's Hall, at 6.30, Dr. Cayley in the chair.

HOSPITAL STAFF.

Consulting Physicians—Dr. A. P. Stewart, Dr. Henry Thompson, Dr. Goodfellow, Dr. Greenhow, F.R.S.
Physicians—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell.
Assistant Physicians—Dr. D. W. Finlay, Dr. J. K. Fowler, Dr. C. Y. Biss.
Obstetric Physician—Dr. Hall Davis.
Physician to the Skin Department—Dr. Robert Liveing.
Assistant Obstetric Physician—Dr. Arthur W. Edis.
Consulting Surgeons—Mr. Shaw, Mr. Nunn.
Surgeons—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Henry Morris.
Assistant Surgeons—Mr. Andrew Clark, Mr. Robert Lyell.
Ophthalmic Surgeon—Mr. William Lang.
Aural Surgeon—Mr. Arthur Hensman.
Consulting Surgeon Dentist—Mr. Tomes, F.R.S.
Dental Surgeon—Mr. J. S. Turner.
Assistant Dental Surgeon—Mr. Storer Bennett.
Curator of Museum and Pathologist—Dr. J. K. Fowler.
Registrars—J. W. Browne, M.A., M.B., Oxon., W. Roger Williams, F.R.C.S.
Chloroformist—Mr. G. Everitt Norton.
Resident Medical Officer—Mr. E. A. Fardon.

LECTURES.

Principles and Practice of Medicine—Dr. Cayley.
Principles and Practice of Surgery—Mr. Morris, M.A., M.B.
Practical Surgery—Mr. Andrew Clark.
Physiology and General Anatomy—Mr. B. Thompson Lowne, F.L.S.
Descriptive and Surgical Anatomy—Mr. Arthur Hensman.
Chemistry—Mr. W. Foster, M.A., Cantab.
Pathological Anatomy—Dr. Coupland.
Clinical Lectures on Medicine—Dr. Cayley, Dr. Coupland, Dr. Douglas Powell.
Ditto on Surgery—Mr. Hulke, F.R.S., Mr. George Lawson, Mr. Morris.
Ditto on Diseases of Women and Children—Dr. J. Hall Davis.
Dissecting-room—Mr. Hensman, Mr. J. B. Sutton, and Mr. W. H. Crago.
Midwifery and Diseases of Women and Children—Dr. J. Hall Davis.
Materia Medica and Therapeutics—Dr. Thorowgood.
Medical Jurisprudence—Dr. D. W. Finlay, B.A.
Botany—Dr. Biss.
Practical Chemistry—Mr. W. Foster, M.A., Cantab.
Practical Physiology and Histology—Mr. B. Thompson Lowne, F.L.S.
Public Health—Dr. D. W. Finlay, B.A.
Psychological Medicine—Mr. Henry Case.
Comparative Anatomy and Zoology—Mr. Hensman.
Dermatology—Dr. R. Liveing, M.A., Cantab.
Clinical Lectures on Diseases of the Eye—Mr. William Lang.
Practical Demonstrations on Diseases of Women and Children—Dr. Arthur W. Edis.
Ditto on Diseases of the Throat and Ear.—Mr. Hensman.

The Hospital contains 310 beds. There are special departments for Cancer, Diseases of the Eye, Diseases of Women and Children, and Syphilis; also Out-patients' Departments for Diseases of Children, the Throat, and Ear, and Skin.

There are nine Resident Clinical Appointments open to students of the Hospital annually. Two Entrance Scholarships of the annual value of £25 and £20 respectively, each tenable for two years, and a Science Scholarship, value £50, are awarded at the commencement of the Winter Session. Two Broderip Scholarships of the annual value of £30 and £20 respectively, each tenable for two years, are also awarded every year for proficiency in clinical knowledge. The Murray Scholarship, in connection with the University of Aberdeen, is awarded every third year. It will next be awarded in 1883. An Exhibition value Ten Guineas is open to students at the end of their first year.

The Governors' Prize of Twenty Guineas is annually given to the student who, at the end of his third winter not obtaining a Broderip Scholarship, shall pass the best Clinical Examination. Class Prizes are also given.

Clerkships and Dresserships are awarded without fee, and the Clerk or Dresser of the week dines at the Board-room table to have the opportunity of seeing accidents that may be admitted during the evening.

A limited number of general students are also, under certain conditions, allowed this privilege.

The Tutor assists all general students, especially those preparing for their examinations, and thus the necessity of obtaining private instruction is obviated.

Several members of the staff receive students as boarders. For particulars apply to the Dean.

For Prospectus and further information, apply to the Dean, or the Resident Medical Officer, at the Hospital.

The Dental Hospital of London

MEDICAL SCHOOL, LEICESTER SQUARE.—The WINTER SESSION will commence on MONDAY, OCTOBER 2.

LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 7 p.m., commencing on October 4.
Metallurgy—Prof. Huntingdon (King's Coll.), F.I.C., F.C.S., &c., on Tuesdays, at 12 o'clock, commencing on October 3.

The SUMMER SESSION will commence in May, 1883.

Dental Surgery and Pathology—Mr. Alfred Coleman, F.R.C.S., L.D.S., on Tuesdays and Fridays, at 8 a.m.
Dental Anatomy and Physiology (Human and Comparative)—Mr. C. S. Tomes, F.R.S., M.A. Oxon, M.R.C.S., L.D.S., on Wednesdays and Saturdays, at 8 a.m.
General Fee for Special Lectures required by the Curriculum, £15 15s.

DENTAL HOSPITAL OF LONDON.

Consulting Physician—Sir Thomas Watson, Bart, M.D.
Consulting Surgeon—Mr. Christopher Heath, F.R.C.S.
Consulting Dental Surgeons { Mr. S. Cartwright, F.R.C.S. / Mr. John Tomes, F.R.S.

		Dental Surgeons.	*Assist.-Dental Surgeons.*
Monday,	9 a.m.	Mr. D. Hepburn	Mr. F. Canton.
Tuesday,	,,	Mr. Medwin	Mr. A. S. Underwood.
Wednesday,	,,	Mr. Gregson	Mr. Truman.
Thursday,	,,	Mr. Hutchinson	Mr. R. Woodhouse.
Friday,	,,	Mr. Moon	Mr. Storer Bennett.
Saturday,	,,	Mr. A. Hill	Mr. G. Parkinson.

Chloroformists { Mr. Clover, F.R.C.S.; Mr. Braine, F.R.C.S.; Mr. Bailey, M.R.C.S.; Mr. T. Bird, F.R.C.S.

Medical Tutor—Mr. Morton Smale, M.R.C.S., L.D.S., L.S.A.
Demonstrators—Mr. Claude Rogers, M.R.C.S., L.D.S., D.M.D., and Mr. John Ackery, M.R.C.S., L.D.S.
House-Surgeon—Mr. W. Hern, M.R.C.S., L.D.S.
Assistant House-Surgeon—Mr. Cornelius.

The Medical Tutor holds Classes before each examination. The Demonstrator attends each day.

The House-Surgeon and Assistant House-Surgeon attend daily while the Hospital is open.

On every day during the Lecture Session the Surgeons of the day will, if practicable, give Demonstrations, especially intended for the Junior Pupils, of the Operation performed in Dental Surgery.

The Saunders Scholarship of £20 per annum and Prizes are open for competition.

Fee for Two Years' Hospital Practice required by the Curriculum, £15 15s. Fees for Lectures and Practice, £31 10s. Additional Fees for a General Hospital for the two years to fulfil the requirements of the Curriculum vary from £40 to £50.

Further particulars may be obtained on application to the Dean, at his private residence, 11, Bedford Square, W.C., or at the Hospital, where he will attend in the afternoons from September 26th to October 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.0.

T. F. KEN UNDERWOOD, Dean.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

130, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE ON SEPTEMBER 4th.

A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER and DECEMBER candidates. Enclose stamp for particulars.

Laboratory close to Gower Street Station.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

TERMS FOR ADVERTISEMENTS

IN THE

PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION

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Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

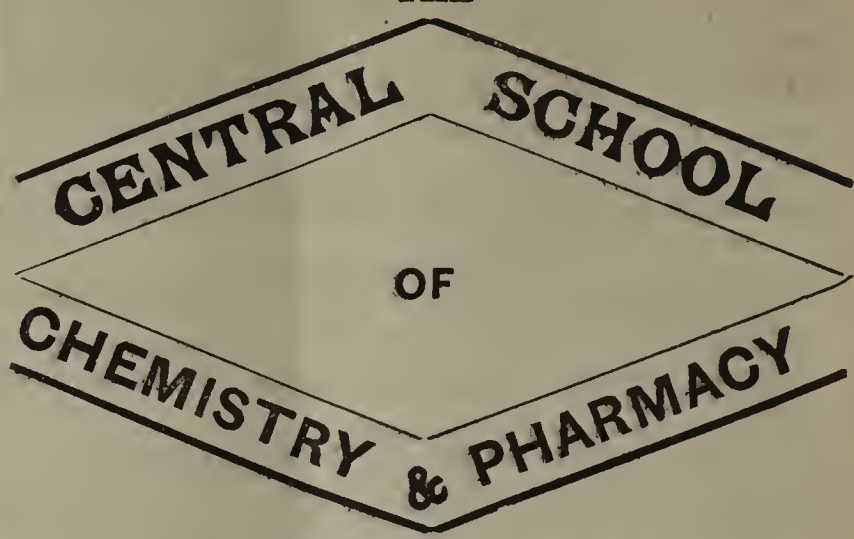
1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

J. & A. Churchill, 11, New Burlington St., London, W.

THE



Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The Classes for the October and December Examinations have now commenced. Students requiring benches reserved are requested to communicate at once with the Proprietors. On examining the lists of successful Students during the past session who have prosecuted their studies at this school, it is found that 80 per cent. passed the first time of their presentation, and this being usually the case, candidates, by undergoing a course of instruction at the Central School of Chemistry, are thus saved time and expense.

For prospectus and terms, apply to

Messrs. LUFF & WOODLAND.

SCIENCE AND ART DEPARTMENT.

Normal School of Science and Royal School of Mines, South Kensington and Jermyn Street. The Session 1882-83 will open on October 2nd, 1882. The Prospectus may be obtained from the Registrar, Normal School of Science, South Kensington, S.W.

WILLS' UNIVERSAL POSTAL SYSTEM.

NOTICE TO PRELIMINARY STUDENTS.

We are astonished to find that so many failures still occur in the Preliminary Examination of the Pharmaceutical Society, after the enormous expenditure which has been incurred in producing such a thorough course of teaching as the Universal Postal System. In July last, 370 Candidates presented themselves, of whom 181 failed. Had these rejected candidates been through a course of instruction under this system, the probability is that two-thirds of them would have passed.

As we never publish the List of Candidates who pass by this means, Students are unable to judge of its usefulness, we can therefore only refer them to numerous successful Students, and to the press, of which the following is an extract:—

The Magazine of Chemistry and Pharmacy.—"Probably the young man who is an assistant, or apprentice, some hundreds of miles from London, will declare with a regretful sigh that he cannot afford the time or the money to come to London and study, and that he has no means beyond his own personal efforts therefore to rely on. We should cordially sympathise with this person, because we feel sure he would never be successful, did we not know that he has an all-sovereign balm for his woes at hand, obtainable for the expenditure of a mere trifle, and therefore leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness. Mr. Wills, of Westminster College, one of our most thoroughly successful 'tutors,' extends him a helping hand. We cordially advise a trial of Mr. Wills' principle, and we have every confidence the essayist will not be disappointed.

FEE, 10s. 6d.

BEWARE OF IMITATIONS.

For Syllabus and testimonials, apply (enclosing stamp) to Messrs. WILLS & WOOTTON, Westminster College Trinity Square, London, S.E.

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

The Eleventh Session commenced on Friday, September 1st.

No more Students can be received in the Major Laboratory.

FEES.

Until the October Examination...	£4 4s.
Until the December ,, ...	£8 8s.
Until Qualified (Minor)	£10 10s.
Until Qualified (Minor and Major)	£15 15s.

The next Course will commence on Friday, October 27th.

Students are strongly advised to enter at the commencement of a Course of Lectures. Entries are now being received for October. Gentlemen desirous of attending the next Course of Lectures, should send in their names as early as possible, as there will be only a few vacancies.

EVENING CLASSES.

The above Classes re-assembled on Tuesday, September 5th, and will be continued through the Session.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

AS ASSISTANT. Mixed country business. Midlands preferred. Good Dispenser and Counterman. 11 years' experience. Age 26. State salary, in or out-door. SPIRO, Alvaston, Derby.

TEMPORARY MANAGER or ASSISTANT. Highest references. At liberty the 16th inst. for the first time this year. A. P. S., 79, High St., Sheerness.

IN London or suburbs.—As ASSISTANT. Age 22. Height 5ft. 10in. Accustomed to good Dispensing and first-class Retail. Has Minor and Hall qualifications. Good references. L., Mr. E. Taylor, Fountain St., Huddersfield.

ENGAGEMENTS WANTED.

MANAGER or SENIOR. Out-door. Age 30. 15 years' experience. Minor qualification. CHEMICUS, Messrs. Evans, Gadd & Co., 97, Fore St., Exeter.

IN a good class Retail and Dispensing business. Passed Prelim. Over 2 years' experience. J. T. BRUNYEE, Crowle, viâ Doncaster.

AS ASSISTANT. Disengaged Oct. 1st. Good country business. Passed Preliminary. 6 years' experience. Age 22. Height 5ft. 8in. Excellent references. W. E. BOLTON, St. Mary's Abbey, Bedford.

AS ASSISTANT. Minor. Age 24. Tall, and of good address. Best London experience and references. Speaks French. Out-door preferred. Disengaged Oct. 4th. MINOR, 156, Clapham Rd., S.W.

WHOLESALE Drug, Drysaltery, Oil and Colour trade.—As MANAGER or part MANAGER and TRAVELLER. Provinces or abroad. ALPHA, Rose Ter., 32, Spilsby Rd., Boston.

AS ASSISTANT. Out-door preferred. Age 22½. Height 5ft. 10½in. Good references. 7 years' experience. B., Mr. Backhouse, Chemist, Upperhead Row, Leeds.

AS ASSISTANT or MANAGER, in a good class Dispensing business. R. D. EVANS, 178, Islington, Liverpool, E.

AS ASSISTANT or DISPENSER to a Surgeon in country town. Out-door. Age 23. Good references. Please send particulars to C. W. M., 1, Church St., Driffield, Yorks.

MANAGER of Branch or out-door, by Registered Chemist. Married. Accustomed to Postal duties. 11 years in present situation. F., 8, Upper Aughton Rd., Birkdale, Southport.

AS JUNIOR. Age 18. Height 5ft. 8in. 3 years' experience in Dispensing and Retail. M. L. GRIFFITH, 34, Church Rd., Weston-super-Mare.

AS JUNIOR, in a good Dispensing business. 4 years' experience. Age 20. Passed Preliminary exam. Good reference. South preferred. PERCY RANDALL, Mr. Randall, Chemist, Wareham, Dorset.

BY a gentleman, aged 33, of considerable experience, as MANAGER or TRAVELLER. Minor by exam. SPES, Mr. Green, High St., Christchurch.

AS ASSISTANT. In or out-door. Age 26. 12 years' experience. Can Prescribe, Dispense, and Extract Teeth. Moderate salary. Good reference. R. B., 99, East St., Southampton.

OUT-DOOR ASSISTANT or DISPENSER to Surgeon or Dispensary. Minor qualification. Experienced. Good references. Very moderate salary. DISPENSER, 39, Norland Rd., Notting Hill, W.

AT once.—As JUNIOR. Ætat. 23½. Abstainer. Good reference. Churchman. Salary not so much an object as a comfortable home. STATIM, 46, Waterworks St., Hull.

AS JUNIOR, where more than 1 are kept. Age 23. Good Dispenser. 6 years' experience. Disengaged 26th inst. ALPHA, 24, Bouverie Rd., Folkestone.

AS Junior ASSISTANT. Age 19. Now disengaged. Excellent references. A. B., Mr. W. Lloyd, Chemist, Carmarthen.

AS LOCUM TENENS.—A gentleman, of long experience in first-class Retail (Ph. Chemist), seeks an engagement for a short or long period. ALPHA, Hamilton Villa, Charlton, Cheltenham.

JUNIOR or IMPROVER. Age 20. Height 5ft. 2in. London, Brighton, or S.E. coast preferred. Disengaged. J. B. F., 8, Fort Rd., Margate.

IMMEDIATELY.—As JUNIOR. 5½ years' experience. Age 19½. Height 5ft. 8½in. Salary £25. F. ROBINSON, Post Office, Alfreton, Derby.

ENGAGEMENTS WANTED.

AN ASSISTANTSHIP, with good introduction. Major qualification. Age 22. C. G. C., 309, East India Rd., Poplar, E.

AS ASSISTANT or DISPENSER, partial engagement, or situation with time for study. London preferred. Age 23. Height 5ft. 5in. GERTH GOWLAND, 19, Shaftesbury St., Hoxton, N.

AS ASSISTANT, in Mixed and Agricultural business 8 years' good experience. Age 24. Height 5ft. 7in. Irreproachable references. Disengaged 18th inst. J., 176, High St., Hounslow.

AS out-door ASSISTANT, in good house of business. Married. Minor qualification. Age 30. G. TAYLOR, 3, Dysart Bldgs., Nantwich.

AS ASSISTANT or DISPENSER. Out-door. Age 23. Married. 6½ years' experience. Good references. CHEMICUS, 12, Gleave St., Everton Rd., Liverpool.

OUT-DOOR, or as MANAGER. Qualified. London and country experience. Can Prescribe and Extract Teeth. Married. No family. Temporary or permanent. Disengaged. CHEMIST, 17, Marian St., Hackney Rd.

LOCUM TENENS or TEMPORARY. Terms moderate. Excellent references and testimonials. R. E. BUNN's (of 12, Unity Pl., Woolwich) present address is, Mr. Barnes', Chemist, 54, Biggin St., Dover.

ADVERTISER, aged 24, wishes to gain experience in the Retail, in a good Dispensing business. Good references. Minor qualification. S. F. B., 41, Princess St., Leicester.

DRUG Trade.—By a gentlemen, re-engagement as MANAGER, LOCUM TENENS, or any place of Trust. Experienced, town and country. Good Prescriber. References given. Disengaged. HOLE, Westbury, Wilts.

LOCUM TENENS. For day or week, &c. Registered Major. Long and varied experience. Good town and country references. Moderate terms. Present (temporary) address, Mr. EVANS, Union House, Haverfordwest.

AS JUNIOR in a good Dispensing business. 4½ years' experience. Now disengaged. A. C., 54, Montague Rd., Uxbridge.

EVENING Employment in London required as a permanency by a gentleman, aged 22, as DISPENSER and BOOKKEEPER to a Surgeon or Chemist. Excellent reference for trustworthiness and ability from present employer. Salary required, 21s. per week. EPSILON, Mr. Smith's Bookstall, Addison Rd. Station.

WHOLESALE Drug Trade.—The Advertiser, of some years' experience, is open to an engagement in either Office or Warehouse. DRUGGIST, Mr. Hayward, 32, Hubbard St., West Ham.

AS ASSISTANT. London or suburbs. Qualified. Age 23. Town and country experience. Good references. ALPHA, 12, Westbourne St., Sloane Sq., S.W.

LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. 30 years' town and country experience, and unexceptionable references extending over the last 12 years. Disengaged Sept. 11th.

AS ASSISTANT, in London. In or out-door. Good experience. Mr. JOHN SHUTT, Manor House, Shifnal, Salop.

AS ASSISTANT, in good Dispensing business. Age 21½. 5½ years' good experience. Good references. Disengaged. J. C. LLOYD, 15, Chelsham Rd., Clapham, S.W.

AS MANAGER. Temporary or otherwise. First-class town and country references. No family. J. H., Holly House, Upper Clapton.

DISPENSER to Surgeon, or ASSISTANT to Chemist. Temporary or otherwise. Age 28. First-class testimonials. F., 6, St. Thomas Rd., Finsbury Park, N.

ASSISTANTS WANTED.

IMMEDIATELY.—An ASSISTANT about 23 years of age, capable of taking charge of business during absence of principal. Apply to F. B. SELLORS, Chemist, Tewkesbury.

AN ASSISTANT in a light Retail and Dispensing business, with a knowledge of Mechanical Dentistry, whose character will bear strict investigation, and seeking a permanency. Address, stating age, salary, &c., WARD SHAW, Chemist and Surgeon Dentist, 5, Charles St., Hull.

TO proceed to the Cape Colony.—A gentlemanly ASSISTANT holding Minor qualification. Not over 24. 3 years' engagement. £12 10s. first, £13 second, and £15 third year, per month, with apartments, but not board. First-class passage paid out. Application by letter in first place to B. G. LENNON & Co., 11, Edmund Pl., Aldersgate St., E.C. Applications not answered in 2 days may be considered declined.

2ND October.—A competent ASSISTANT, about 25 years of age. Must be a neat and accurate Dispenser and good Counterman. Apply to W. PINYON, Chemist, 49, Abbey Rd., St. John's Wood, N.W.

MESSRS. BREARLEY & BASCOUL, Cannes, France, require, for the season, 2 ASSISTANTS. Hours from 8 till 10. Apply, stating salary (out-door), with full particulars, to J. E. BREARLEY, 23, Lavender Villas, Bromley, Kent.

SEPT. 20.—An ASSISTANT, thoroughly competent to take entire charge of a light Retail, Prescribing and Dispensing business. Must be a good Counterman. State age, height, salary, and all previous engagements, and enclose carte. Applications not replied to in 4 days to be considered as respectfully declined. J. GRIFFITHS RICHARDS, Hastings.

TO Parents and Guardians. — R. H. TREWEEKS, Chemist and Bookseller, Pembroke, is in want of an APPRENTICE. Terms on application, and references exchanged.

IMMEDIATELY.—A Junior ASSISTANT of good address, or an IMPROVER. Apply personally, if possible, to E. L. HICKEY, 199, King's Rd., Chelsea.

AN in-door ASSISTANT for light Retail and Dispensing. Only one employed. Must be a neat and accurate Dispenser and of good address. State age, references, when disengaged, and salary required. C. W. REED, 190, High St., Lewisham, S.E.

MR. IVE has a vacancy for a competent JUNIOR, with Minor qualification, accustomed to good class Retail and Dispensing. Apply personally at 115, Gloucester Rd., South Kensington.

AN ASSISTANT, qualified, business-like, and competent to the duties of a good Country business of the better class. One who has had experience in good provincial houses preferred, and capable of occasional Management. Sunday duty nominal. Apply, with full detail, to C., care of Sanger & Sons, Oxford St., London.

AN out-door Junior ASSISTANT, well up in both the Retail and Dispensing department. Apply, stating salary required, and enclosing carte and testimonials, to GOULDINGS, Chemists, Cork.

AN ASSISTANT, in a Dispensing and light Retail business, not under 25 years of age. Capable of Management during absence of principal. Must have good references. Apply, with usual particulars, to J. B. MERRIKIN, Bath.

JUNIOR ASSISTANT. Minor qualification necessary. State age, salary required, and usual particulars. No answer within one week to be considered declined. Mr. NEMO, care of Oridge & Co., 32, Ludgate Hill, London, E.C.

ASSISTANTS WANTED.

A QUALIFIED ASSISTANT, out-doors, as MANAGER in a good Mixed business. Wholesale and Retail. Capable of Dispensing and Prescribing. Send age, height, salary required and references, enclosing carte, to TRIBE & LAMB, Pharmaceutical Chemists, Chatham.

JUNIOR ASSISTANT.—Immediately, for good Country business in market town. Wine and spirit business attached. Must be thoroughly steady, &c. About 21. Salary £20 to £25. Apply, with full particulars, references, photo., &c., to BULMER & SON, Pocklington, Yorks.

A COMPETENT ASSISTANT, of good address. Accusto first-class Dispensing and Retail business. Give references, age, height, and salary required. LIVERPOOL APOTHECARIES' Co., 4, Colquitt St.

MANCHESTER.—WRIGHT & BARNABY, Pharmaceutical Chemists, 223, Oxford St., near Owen's College, require an in-door ASSISTANT, about 24 years of age. Must have had recent experience in a Dispensing business. State age, height, salary, when at liberty, and enclose carte (to be returned).

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IMMEDIATELY.—A steady, trustworthy ASSISTANT, of good address, about 27 years of age. Must be good Salesman, Dispenser, Prescriber, &c., and able to Manage in owner's absence, who has another business to supervise. In-doors. Hours 8 to 8 usually. One half holiday weekly. No Sunday duty. References, salary, and carte to E. B. FORD, Pontypool.

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EARLY in October.—A good JUNIOR, age about 22, with Minor qualification preferred. Please state height, salary (in-doors), previous engagements, and enclose carte, to J. G. ATKINSON, Pharm. Chemist, 2, Albert Ter., Kilburn, N.W.

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BY a Medical Man. In-doors. With or without a qualification. Must be a quick and accurate Dispenser, able to visit occasionally and attend a case of Midwifery. Strictly sober and reliable. Suit a gentleman seeking a permanency. Good references. Address, stating particulars and salary expected, to MEDICUS, care of Dr. Owen, 201, Bethnal Green Rd., E.

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A COMPETENT trustworthy ASSISTANT. Out-door. Of good address. Age about 24. Apply, stating age, height, and experience, also send carte, returnable, to CHYMIST, 35, Berners St., Oxford St., W.

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IMMEDIATELY.—Owing to ill-health. A genuine ready-money RETAIL in Worcestershire. Returning £14 weekly. For particulars, address Mr. H. W. CALL, 36, Maryleport St., Bristol.

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Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

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B.—H. G. offers a BUSINESS on account of the illness of Proprietor for £250. Average returns £500.

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ALMANACS.

PUBLISHERS of Almanacs requiring Advertisements are requested to send a sample copy, stating circulation, and lowest terms for page, half page, and quarter page advertisements, to B. S., care of Newberys, 1, King Edward St., London, E.C.

Midland Counties' Transfer Agency.

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4. SURREY.—Retail, Prescribing and Dispensing BUSINESS. Returns about £500 yearly. Well-fitted shop and good house. Price £500.
5. YORKSHIRE.—Death vacancy. Retail and Dispensing BUSINESS. Returns £600 yearly. Held by late owner nearly 50 years. Price about £500, or small premium. Stock and fixtures at valuation.
6. CAMBRIDGESHIRE.—First-class Retail and DISPENSING. Full prices. Returns nearly £900 yearly. Price about £900. Full investigation.
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Theobromine and Gluten are the stimulating and flesh-forming constituents of genuine Cocoa. Dr. MUTER has made the following table of comparative values :—

	Cocoa Nibs, genuine.	Cocoa Essence, genuine.	Mixture No. 1. Starch and Sugar.	Mixture No. 2. Starch and Sugar.
Theobromine ..	0·90	1·20	0·43	0·50
Gluten	12·21	18·30	6·45	7·35

and adds :—"Thus we clearly see the nonsense talked by those who, for reasons best known to themselves, are found to palliate, and even support in writing, the 'preparation' of Cocoa by mixing it with starch and sugar."—*Analyst*, April, 1879.

The large Consumption this Cocoa has obtained, combined with the almost universal manner in which it has been recommended by Medical Men, has induced imitations by several manufacturers, which are sometimes substituted for the genuine article.

COCOA AND CHOCOLATE MAKERS BY SPECIAL APPOINTMENT TO THE QUEEN.

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The
Pharmaceutical Journal
AND
Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 4th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The Sessional Prizes and Certificates will be distributed at this Meeting. Successful Candidates will be expected to attend. An Address to the Students will be delivered by JOSEPH INCE, F.C.S., F.L.S. *All Students and friends, ladies and gentlemen, are invited to be present.*

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

PRELIMINARY EXAMINATION.

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH.

119A, GEORGE STREET, EDINBURGH.

The Society's Rooms will be closed from August 12th to September 11th.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session will commence on Monday, October 2nd, 1882, as follows:—

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

At 8 p.m. on Wednesday, October 4th, the School Prizes will be distributed, and an Address to the Students be delivered by JOSEPH INCE, *F.C.S., F.L.S. All Students and Friends, ladies as well as gentlemen, are invited to be present.*

THE LECTURES ON
CHEMISTRY AND PHARMACY

Will commence on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Will commence on Friday, October 6th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, will commence on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

NOTICE TO ADVERTISERS.

THE PHARMACEUTICAL JOURNAL
AND
TRANSACTIONS

Has a Guaranteed Circulation of **7000** Copies Weekly.

Terms for Advertisements may be obtained of the Publishers. Those for Engagements, Assistants, Businesses, &c., which must be prepaid, will be found on page xviii.

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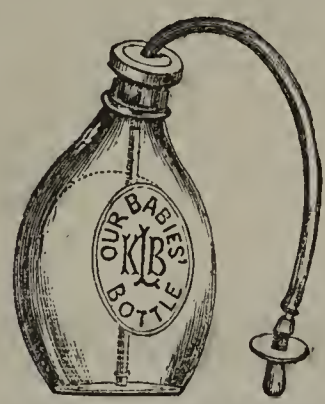

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THE INTERNATIONAL ELECTRIC EXHIBITION.

(*Continued from page* 143.)

The last economic application of electricity for obtaining light it is intended to notice in these articles is the "secondary or storage battery." The introduction of this electrical apparatus into the electric lighting industry will, without doubt, be found sooner or later of the utmost consequence in providing a steady flow of electricity in the electrical mains that are to be laid in a short time in the streets of the metropolis and in those of numerous provincial towns. The discovery of the phenomena utilized in the storage battery appears to have been made in 1801, by Gautherot, who observed that the platinum wire electrodes that had been used in the electrolysis of salt water were capable of yielding a transient electrical current after being detached completely from the battery. This discovery, made a year after Nicholson and Carlisle's fruitful announcement of the electrolytic decomposition of water, is the foundation of the modern storage battery or accumulator. It clearly explained the cause of the diminishing electromotive force of a voltaic battery when working on short circuit, as it was recognized almost at once that this momentary secondary current was opposite in direction to the primary current. In the first voltaic cells made, this opposing electromotive force was found to be an evil of such magnitude as to reduce the electromotive force of the battery, after a few minutes' continuous working, by one-half the original sum. This opposing electromotive force was denominated polarization of the plates, and constant attempts were made to make up a cell which should be free from this grave inconvenience. Apparently the first to design a practically perfect "constant" battery was Professor Daniel, of King's College, whose world-renowned combination has never been surpassed for producing constant electromotive force on short circuit.

This evil of former times has of late given promise of being of almost as much importance to electricians as the generator of the primary current itself. Without dwelling further upon the historical part of this subject it may be assumed that all the recent experimenters are working on the lines laid down in the first instance by M. Gaston Planté in 1869. To that experimenter more than to any other is due the progress that has been made in this direction. M. Planté devoted some twenty years to the elucidation of polarization, employing different metals as electrodes and different liquids as electrolytes. As a result of his continued researches he ascertained "that the greatest effective polarization was produced when dilute sulphuric acid was electrolysed between electrodes of lead." The form of cell preferred by Planté is circular and contains two spirally rolled sheets of lead rendered mechanically discontinuous by interposed strips of guttapercha; the two plates are covered with dilute sulphuric acid. The method of forming the cell by the passage of a current through it must be conducted in a peculiar way, minutely detailed by Planté; and the process unfortunately requires a considerable time before the cell gets in the best possible condition. The process is given in full in Gordon's 'Treatise on Electricity and Magnetism,' and also by Mr. J. W. Swan in a lecture which will be found in vol. v., p. 122, of the *Transactions of the Newcastle-upon-Tyne Chemical Society*.

On passing a current through the dilute sulphuric acid and lead plates of the Planté cell the plate by which the current enters becomes coated with peroxide of lead and the plate by which the current leaves the cell becomes covered with spongy metallic lead occluding large quantities of hydrogen gas. When these plates are united by a wire a secondary current starts from the peroxide plate and passes through the wire to the plate covered with spongy lead. It is almost sufficiently accurate to regard the cell as a voltameter with oxidizable electrodes, or as a voltameter in which the products of the electrolysis of dilute sulphuric acid are collected in the solid form; hydrogen being occluded by spongy lead, and oxygen combined with lead as peroxide. On discharging the cell the hydrogen and oxygen recombine to form water, or in other words the peroxide of lead disappears and the cell practically again becomes two simple lead plates in dilute acid.

As the elements recombine electricity is produced, the amount of current yielded being mainly dependent on the amount of peroxide of lead reduced. Hence it follows that a secondary battery does not store electricity in the same manner that the Leyden jar stores a charge of static electricity, or as a gas-holder stores gas; the storage or secondary battery stores electrical energy in a somewhat analogous manner to that in which coal stores heat energy, that is to say, certain substances are present in suitable conditions for producing electricity in one case and heat in the other.

The electromotive force of a Planté cell is as much as 2·38 or 2·7 volts when fully formed, and "as the large area and close proximity of the plates diminishes the resistance of the liquid to a very small quantity, such cells are capable of furnishing a very powerful current for a few minutes, and their calorific power is considerable. M. Planté shows that there is a loss of 11 or 12 per cent. between charging and discharging, and that of the whole current absorbed by the cell 88 to 89 per cent. is given back by the cell. According to M. Géraldy, a Planté cell containing 1·445 kilogramme of lead can store 4·983 kilogrammetres of energy, being at the rate of 3·45 kilogrammetres per kilogramme, or 11·329 foot pounds per pound."

Messrs. Gladstone and Tribe have contributed some valuable papers to *Nature* (vol. xxv., pp. 221 and 461, also in vol. xxvi., p. 251), on the "Chemistry of the Planté and Faure Accumulators," which form the best addition to our knowledge of the matter that has been written. The authors took up the inquiry in the first instance in order to ascertain if any resemblance existed between the "copper-zinc couple" discovered by them and the negative plate of the Planté and Faure accumulators. The copper-zinc couple owes its activity to what is well known to electricians as "local action," this name being given to the chemical action resulting in the development of electricity which occurs when a circuit of two mechanically adherent different metals is placed in a solution having a chemical action on the one and less or none on the other. In the copper-zinc couple of Gladstone and Tribe sheet zinc receives a coating of finely divided metallic copper by immersion in a weak solution of sulphate of copper. On placing this couple in water, bubbles of hydrogen gas are given off, and oxide of zinc is formed and

remains in the liquid as such. This method of obtaining nascent hydrogen in a neutral liquid has been found of great service in analytical chemistry, and in the hands of its discoverers has been very effective in the formation of certain difficultly prepared organic compounds. From these results with the copper-zinc couple it appeared nearly certain to Messrs. Gladstone and Tribe that the formed negative plate of the Planté accumulator, consisting of metallic lead and very closely adherent peroxide of lead immersed in dilute sulphuric acid, must give a large amount of local action, especially as the electromotive force of lead and peroxide of lead in dilute sulphuric acid is three times as much as it is with zinc and copper in the same liquid. As expected, a continual local action was found to take place, resulting in the attached peroxide of lead being completely converted into white sulphate of lead. This apparently wasteful action was found to be absolutely necessary for future practical storage purposes in this way: the sulphate of lead formed all suffers decomposition when the cell is charged next time into finely divided metallic lead; this finely divided lead becomes ultimately converted into peroxide of lead, and thus the storage capacity of the cell increases with each recharging. The authors found quantitatively that the amount of peroxide of lead formed increased at every charge up to at least the fifth time of recharging, beyond which the experiment does not appear to have been carried. Messrs. Gladstone and Tribe think it is more in accordance with the observed facts to regard the electrolysis in the cell as being the electrolysis of sulphuric acid rather than that of water rendered conducting by admixture of acid. They state that if water alone is used in the cell the hydrated protoxide of lead is formed instead of the peroxide, even if twenty-four Grove's cells are employed to charge one Planté cell; but the addition of a single drop of sulphuric acid to the water causes the immediate production of the puce-coloured peroxide to be made manifest. The authors give some ingenious and probable chemical equations for representing the chemistry of the charging of the cell. The first of the equations shows the formation of peroxide of lead by the electrolytic decomposition of sulphuric acid; the second equation takes account of the formation of peroxide of lead from the decomposition of previously formed sulphate of lead. These distinguished investigators think that it is not improbable that both these reactions may take place according to the varying density, or other circumstances of the current. They also say that the coating of peroxide interposes a great difficulty in the way of the further oxidation of the metallic lead, and that hence Planté needs the successive periods of repose, to admit by local action of the formation of lead sulphate, and the oxidation of the increasing amounts of finely divided lead. To save this waste of power and time Faure covers both plates with red lead, and converts this into spongy peroxide and spongy lead respectively by the current. When minium is placed in dilute sulphuric acid it suffers decomposition in the following manner:—

$$Pb_3O_4 + 2H_2SO_4 = PbO_2 + 2PbSO_4 + 2H_2O.$$

It was found that 18·1 per cent. of the red lead was converted into lead sulphate after one hundred and twenty minutes. The authors, in commenting on this, show how all the sulphuric acid might be taken up if this point were neglected, leaving in such an event water only in the cells. Serious injury might be done to cells if this should take place, as a phenomenon might occur like that noticed by the authors when studying the phenomena accompanying the electrolysis of water with oxidizable electrodes. In this investigation oxide of lead was found to form, which eventually became converted into grey metallic lead, and this, after twenty-two hours, stretched across from plate to plate, "forming a metallic connection," which was so much heated by the passage of the voltaic current that the liquid became warm. It is stated that this modified "lead tree" has sometimes been found in Faure's cells. It is shown that there is probably no advantage in continuing the charging after the oxygen has ceased to be absorbed freely.

Messrs. Gladstone and Tribe conclude on very satisfactory grounds that the chemical action of the discharge is essentially what is expressed by the following theoretical formula:—

$$PbO_2\ H_2SO_4\ H_2SO_4\ Pb = PbO\ H_2O\ H_2SO_4,$$

which becomes—

$$PbSO_4\ H_2O\ H_2O\ PbSO_4.$$

This reaction is, however, sometimes complicated by the formation of a small amount of peroxide of lead on the positive plate, which is believed to be due to the oxidation of sulphate.

Messrs. Gladstone and Tribe conclude from their researches that unless the peroxide of lead unacted upon is allowed to be very considerable the quantity of lead compound on the two sides ought to approach equality; also that care should be taken that sulphuric acid is in sufficient excess to allow of some of it in still remaining solution after all the available lead has been converted into sulphate. If it is removed and only water is present, an oxide or hydrate will be produced with probably some serious consequences to the cell.

(*To be continued.*)

A BISMUTHIC HAIR-DYE.*

BY A. NAQUET.

The author states that he was induced by a knowledge of the injurious properties of the many hair-dyes that are put forward as perfectly harmless to make the attempt to produce one that should be fairly entitled to that description. Whilst working upon the subject he protected the different steps by patents, in order to secure priority, but having attained what he considers to be a satisfactory result he has now abandoned his rights for the public benefit.

M. Naquet's experiments were made in the direction of compounding a metallic tincture that should have an innocuous metal for a basis instead of lead, and for this purpose he selected bismuth. The preparation which was the subject of his first patent consisted of two solutions that were mixed immediately before being used, and he describes the method of making it as follows.

It has long been known that a solution of bismuth is obtained in treating bismuthic hydrate with a solution of bitartrate of sodium; but it is not very easy to prepare and not more than a very small proportion of the bismuthic hydrate employed is ever dissolved. M. Naquet therefore sought an easy method of preparing the double tartrate of potassium (or sodium) and bismuthyl ($C_4H_4NaBiOO_6$). The bismuth is dissolved in the smallest possible quantity of nitric acid and to this is added

* Abstract from communication to the *Moniteur Scientifique*, [3], xii., 880.

an aqueous solution of tartaric acid (3 parts of acid to 5 of bismuth) and a large quantity of water; the whole is then thrown on a filter and the precipitate washed. The wash water contains some bismuth, which can be removed by precipitating with a sulphide, then redissolved in nitric acid and used in a subsequent operation. The well washed precipitate, whilst still moist, is dissolved in a boiling solution of sodic bitartrate (12 to 15 parts of bitartrate to 5 of bismuth), then filtered, diluted with water, alcohol and glycerine, and again filtered. Each litre should contain 150 c.c. of glycerine, 150 c.c. of alcohol and 600 c.c. of water. The proportion of bismuth present should be 2 grams of metal per 1000, and if the liquor contains more or less it should be brought to that strength. The paper through which this liquid is filtered will retain some bismuth, precipitated by the alcohol; this can be redissolved in nitric acid and again used.

The bismuthic solution alone does not dye, but mixed with sodium hyposulphite it soon deposits sulphide of bismuth which dyes the beard and hair. But as this mixture is quickly decomposed it must not be made until just as it is going to be used. This form of bismuthic hair-dye, therefore, requires to be sent out in two bottles, one containing the bismuthic solution, the other the solution of sodium hyposulphite (1 part of solution saturated in the cold diluted with 5 parts of water). When required for use these are mixed together in equal proportions.

The bismuthic product precipitated by tartaric acid and water can be dissolved by means of carbonate of potash, or by any of the caustic or carbonated alkalies, including ammonia, the liquid being after neutralized by a current of carbonic acid gas and filtered. But unfortunately this neutral product, or even one slightly alkaline, does not act as a dye when mixed with either hyposulphite of soda or flowers of sulphur. It can only be used by moistening the hair first with the bismuthic liquid, and then, after it has dried, with a solution of sulphydric acid or a sulphide.

This dye is said to have a progressive action, and to produce all the shades from a light flaxen to a deep chestnut colour, according to the number of applications made.

The second patent was taken out for a preparation that could be sent out in one bottle, M. Naquet while pursing his investigation having found that an ammoniacal solution of the tartrobismuthic product will keep indefinitely when mixed with solution of hyposulphite of soda, if the containing bottle be kept well closed. Such a mixture is said to make an admirable hair-dye, it decomposing and depositing sulphide of bismuth in proportion as it loses ammonia and is acted upon by carbonic acid in the atmosphere, The degree of concentration of the liquid is not of great importance, nor the quantity of ammonia. The following is the working formula given by M. Naquet:—

Dissolve 100 parts of bismuth in the smallest possible quantity of ordinary nitric acid (about 280 parts). To this liquor add a solution of 75 parts of tartaric acid in water and then a rather considerable quantity of water to ensure complete precipitation. The whole is then thrown upon a filter and the residue washed with water until the washings are no longer acid. The magma left on the filter is then put into a dish and solution of ammonia gradually stirred in until all is dissolved. The magma derived from $1\frac{1}{2}$ kilograms of bismuth will require 0·8 or 0·9 litre of ammonia. To this liquor is added 75 parts of hyposulphite of soda in powder, and when the salt is dissolved the product is filtered and put into bottles. In this state it is ready for sending into commerce, but it is of advantage to add 1 or 2 per cent. of glycerine; no addition of alcohol is necessary. The liquid so prepared would contain about 5 per cent. of bismuth. It may be further diluted with water if desired.

The hair or beard when saturated with this liquid acquires after five or six hours a deep chestnut colour. Upon washing the hair this colour disappears, giving place to a delicate flaxen colour. By repeating the operation daily a stage is arrived at when, after passing through all the intermediate shades, the deep chestnut colour remains persistent.

CHINESE CAMPHOR.*

In China camphor is grossly adulterated with a glue obtained by boiling a rattan creeper, locally called T'êngtsai. This weed, growing luxuriantly in the interior of Formosa, from whence, as everyone is aware, all Chinese camphor is derived, is full of a glutinous matter which boiling water converts into a colourless glue. Mixing this with the pure camphor and a small percentage of water prevents evaporation, though naturally destroying the high quality of the article itself. Camphor so adulterated will keep, it is said, for a couple of months without loss; indeed, will bear the journey to Europe without suffering appreciable diminution. Experiments recently made have demonstrated the existence of two parts of glue to three of camphor in certain samples offered in the Tamsui market, rendering the article absolutely useless. Happily fire will readily detect the foreign body. Mr. Walter Lay, to whose admirable report upon the camphor trade in 1880 we are indebted for this information, adds:—"I have obtained a sample of the plant from which the glue is obtained, but cannot find out what its botanical name is; indeed, I have not succeeded even in obtaining the correct Chinese characters for it. It is called locally T'êngtsai, but it doubtless has a more distinctive appellation than that. It is not given in the 'Topography of Tamsui.' Mention is made in the Wahu Report for 1878 of a plant which yields a glutinous substance on being boiled in water, and which is used in the manufacture of paper. The name given to it at Wahu is Yang Kout'êng, and this possibly may be the name of the creeper used here for the adulteration of camphor."

Before the ruthless axe of the Chinese woodcutter the beautiful inland forests still adorned by the graceful *Laurus camphora* are fast disappearing. The aborigines inhabiting the interior fight desperately for the possession of their woods, but each year sees a fresh tract surrendered to their indomitable enemies. To illustrate the difficulty attending the collection of the prized wood, it may be mentioned, on the authority of the above-named gentleman, that between five and six hundred Chinese were killed two years ago in the petty warfare which prevailed with the savages. Sooner or later there must be a dearth of camphor. With their customary want of common prudence the conquering race are recklessly clearing the ground for tea cultivation, burning up the camphor wood in tea-firing operations, for which purpose it can seemingly be used with perfect safety, despite the pungent fumes given forth.

Very little of the camphor manufactured in Formosa is consumed by the Celestials, nearly all being shipped to foreign countries. On the other hand, they continue importing for their own use the more precious natural article secreted by the *Dryobalanops camphora* of Sumatra and Borneo. For these concrete masses, commonly known as Camphor Baroos, fancy prices are still paid,—31*s.* a pound was the import price at Ningpo last year. Of this fine camphor, it may be added, but a small quantity finds its way to Europe; the relative cheapness of the manufactured article driving it quite out of our markets, although it is well known the native manufacturers in Formosa place no special reliance on their own product, which, they say, possesses little or no virtue—very little nowadays, one may opine, if adulteration is carried on to the extent asserted.

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* From a paper on the Chinese Materia Medica, by F. Newcome, in the *Medical Press and Circular*, August 2.

IMPURITIES IN GLYCERINE.*

M. Ferdinand Jean has studied and described in a very competent manner the adulterations and imperfections in the manufacture of glycerine. He states that oxide of lead, lime and butyric acid are the impurities most frequently met with in commercial glycerine, and that they accrue from bad manufacture or incomplete purification. Perfumers test glycerine with nitrate of silver, no sensible coloration resulting at the end of twenty-four hours if it be pure.

The chloroform test consists of mixing equal parts of chloroform and glycerine, stirring, and then leaving the mixture to settle. The mixture separates into two distinct layers, the upper one consisting of pure glycerine, the lower of chloroform and the glycerine impurities. If the glycerine is pure, the chloroform remains clear; if not, a greyish belt is observed at the point of separation.

If to glycerine, diluted with its own volume of distilled water, first a few drops of dilute sulphuric acid, and then a little alcohol be added, a white precipitate may be observed if the glycerine is impure. This will be due to the presence of lime or lead, the latter being indicated if the precipitate is blackened by sulphuretted hydrogen.

The presence of butyric acid is detected by mixing strong alcohol and sulphuric acid with the glycerine, and heating slightly, when the agreeable odour of butyric ether becomes manifest.

Formic and oxalic acids have also been found in glycerine; their detection is very important, especially in glycerine destined for pharmaceutical preparations. This may be effected by mixing equal parts of the impure glycerine and sulphuric acid, sp. gr. 1·83, when carbonic acid gas is given off.

To ascertain if both the above acids, or, if only one, which is present in the glycerine, M. Jean uses the following tests:—1. To a part of the glycerine alcohol of 40° is added, and a drop of sulphuric acid, and slight heat applied; the odour of formic ethyl (peach-flower smell) indicates the presence of formic acid. 2. To equal quantities of glycerine and water add 2 drops of a solution of chloride of calcium containing a little ammonia (free from carbonate); if oxalic acid be present a white precipitate of oxalate of lime will be formed.

Sugar, glucose, gum and dextrine are easily discovered by the following tests:—150 or 200 drops of distilled water are poured on the glycerine to be tested in a porcelain cup; 3 or 4 centigrammes of molybdate of ammonia and a drop of pure nitric acid are added, and the whole is then boiled for half a minute. If the glycerine contains sugar or dextrine a blue coloration is produced. If glycerine adulterated with cane-sugar be boiled with a few drops of strong sulphuric acid a black colour is produced, due to the carbonization of the sugar. Adulteration with glucose is detected by means of caustic soda, the mixture having a brown colour when boiled. To ascertain the quantity of sugar, dextrine or glucose in glycerine the following process may be employed:—5 grams of the impure glycerine are boiled in a small glass beaker with 5 c.c. of distilled water and a slight excess of alkaline solution of tartrate of potash and copper; the precipitate of protoxide of copper is redissolved by adding some hydrochloric acid. The solution is then made strongly ammoniacal, and poured into a solution of nitrate of silver. Metallic silver is immediately precipitated, which is separated by filtration. After washing it with warm ammoniacal water, it is calcined at a red heat, and the weight of the silver taken. As 100 of glucose = 509·6 of metallic silver, the weight of the glucose can be easily calculated. If cane-sugar or dextrine be present it is necessary previously to boil the glycerine for half an hour with acidulated water, in order to convert these matters into glucose.

The quantity of water contained in impure glycerine can be determined, when the density is known, by means of Vogel's formula.

* *Journ. de Pharm. d'Alsace-Lorraine*, ix., 136.

ARROWROOT MANUFACTURE IN QUEENSLAND.*

The machinery used for the manufacture of arrowroot is simple in the extreme, and is chiefly manufactured on the place, the shafts, pulleys and engine work being, of course, foundry made. The first process shown was the roots being tipped by two boys into a long trough, through the length of which a shaft slowly revolved, and by means of wooden projecting pegs the dirty roots were stirred up and so cleaned, there being a constant stream of water running through the trough. These revolving pegs have a screw pitch, so that the roots are gradually moved towards the far end of the trough, where they are caught up by a sort of bucket pump which elevates them some 12 feet and drops them regularly into a hopper. As they fall to the bottom of this they meet the grater, which is a drum of perforated galvanized iron driven at great velocity. A small stream of water pours into this all the time, and the roots are quickly grated up into a brown coloured pulp. This mass of fibre and pulp falls into a cylinder of perforated iron, about 9 feet long and 2 feet in diameter; through the length of this runs an axle on which are two beaters like the drum of a threshing machine; these smash up the fibrous pulp, exposing it to the action of the water, so as to enable all the starch and fine pulp to be washed out and squeezed through the perforations of the cylinder, while from the one end is discharged a constant stream of the dirty looking fibrous refuse. A stranger looking at the process at this stage would think it utterly impossible that the white arrowroot of commerce could be the result of such an unpromising material; however, water works wonders, and an abundance of pure, soft water is essential for the successful manufacture of arrowroot. The finer pulp, as squeezed through the perforations of this cylinder, is received in a precisely similar one below; here again the mass, now only pulp, is beat up; but the perforations around this second drum being very small, only the starch and dirty looking water passes through, the pulp being again discharged from the cloaca at the end. The stream of water and starch pouring from these cylinders is received in troughing, extending for 100 feet around the shed, and, as it runs along, the starch, being heavier than the water, all sinks to the bottom and the water runs away. So far the work goes on automatically, no one but the two boys throwing in the roots troubling themselves about it. But towards the end of the day the stream of water is stopped, and the arrowroot starch scraped up out of the trough, where it has accumulated in a layer some inches in thickness, and is placed in large vats or tubs, all ranged in regular rows. Before being put into these tubs it is passed through fine muslin sieves, and at the same time another stream of water is turned on. These fine sieves effectually clear it of any foreign matter, and it settles by the morning at the bottom of the vats, clean and white as snow. The water is drained from it, and the starch put into a centrifugal machine exactly similar to what is used for sugar; this soon forces out the surplus water, but perfect dryness is essential to its keeping qualities, so it is now carried to the drying room, which is some 60 feet long by 12 feet wide. Round the whole length of this runs a flue heated by a special furnace, and over this are shelves of galvanized wire netting; on this netting is placed calico, and on this is spread out the starch. In this hothouse the moisture is quickly evaporated, and the arrowroot becomes crisp and grain-like. On fine days it is spread out in the sun on similar wire stages. All operations are now finished, and the flour is stowed away in bins in the storehouse, and there made up into the packets usually seen in the shops. For this work-women are employed, and smart hands can earn as much at this employment as their husbands are doing at the rougher work of the mill.

* From the *Queenslander*. Reprinted from the *Weekly Drug News*, August 25, 1882.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 16, 1882.

OPIUM PRODUCTION IN CHINA.

In a volume of commercial reports by Her Majesty's Consuls in China, just issued, there is an unusual amount of space devoted to the subject of opium. As might be expected, the commercial and political aspects of the question occupy the most prominent positions in these reports, but intermixed there is some information upon the cultivation and consumption in China of native-grown opium which appears to be worth culling for these columns. Especially is this the case with the report of Mr. Consul Spence, who has recently spent four months in the province of Szechuan.

It appears that, notwithstanding the pretended opposition of the Chinese Government, the cultivation of the poppy is now carried on in every district of the province of Szechuan, in the south-west of China, except those on the west frontier, but most extensively in the districts of Chungking Fu and Kweichow Fu. Opium is a winter crop, and some of the districts are said to appear at that time of the year like vast poppy fields. For this reason the crop is becoming a great favourite with the farmers, as it does not interfere with rice, the staple food of the people, for when it is planted in paddy lands, as is often the case, it is gathered in time to allow rice or some other crop to follow. Moreover, the conditions under which the tenant farmers hold their land have also hitherto had a similar tendency, as the rent usually consists of a proportion of the summer crop. Landowners are now, however, becoming alive to the importance of the winter crop of opium and are commencing to stipulate for the payment of a proportion of it also. There seems to be some difference of opinion as to the remunerativeness of opium cultivation. Baron Richthofen, writing ten years ago, estimated the yield of opium at 200 ounces per acre; but Mr. Baber, a subsequent observer, has estimated it at double that quantity. Mr. Consul Spence's figures approximate more closely to the latter, he giving an average of 350 ounces per acre. Probably the difference is attributable to the fact that the cultivation is now more carefully carried on and the land well manured. Every part of the poppy plant has a market value: the capsules are sold for use in medicine; oil is expressed from the seeds; the oil cake and leaves are used for manure; and the stalks are burnt for potash. Taking all these sources of revenue into account, opium, as compared with wheat, is estimated to yield a crop of double the value.

A few years since in Szechuan the poppy was grown only on hill slopes of an inferior soil; but now it is cultivated everywhere, and the country people are agreed that it is most profitably cultivated on good ground with liberal manuring. This agrees with experience in India, where it is found to be best grown on rich soil near villages where manure can be easily obtained. According to Mr. Consul Spence the method of cultivation now followed in Szechuan is extremely simple. As soon as the summer crop is reaped the land is ploughed and cleaned, roots and weeds are piled in heaps and burned and the ashes strewed over the ground, and the land is liberally treated to dressings of night soil. The seeds are sown in December in drills 1½ foot apart, the white poppy being by far the most commonly cultivated in the low grounds, though the red and purple varieties are also grown. In the following month, when the plants are a few inches high, the rows are thinned and earthed up so as to leave a passage between each, after which the plants are left to themselves, with the exception that the earth is occasionally stirred and is kept clear of weeds. In March or April, according to the situation, the poppy blooms, and as the capsules form and fill fresh dressings of liquid manure are made. In April and May the capsules are slit and the juice extracted. The total amount of opium produced annually in South-west China, chiefly in the provinces of Szechuan and Yunnan, is estimated at upwards of thirteen thousand tons, or more than twice the whole Indian import into China.

The principal part of the opium exported from the province of Szechuan is carried along mountain paths, on the backs of coolies, to Shashih, and passes from thence into the regular trade channels over the east and south of China; the more convenient mode of transit along the Yang-tsze river is avoided because of the heavy dues. The opium thus becomes available to the poorer classes who cannot afford the high-priced Indian drug. But its cheapness is alleged to be in some degree due to adulteration with oil, glue and other substances, although when pure it is said to be almost as good as Indian opium.

Some statements by Mr. Consul Spence as to the extent to which opium smoking is practised in Western China, and the consequent effects, are sufficiently astonishing. He says that the impression one gets in a Szechuan city or village is that everyone smokes; there it is no question of fractions of 1 per cent., but of 30, 40, or even 60 per cent. of the whole male adult population, besides a large number of women. In the city of Chungking, for instance, where there is a population of 130,000, there are 1230 opium shops, with a daily consumption of 12,000 ounces of opium. In country hamlets and villages, also, almost every second house in the main streets is an opium shop. In some rural districts the people smear the lips of their idols with the drug and at funerals burn paper imitations of pipes of opium, so that the dead may enjoy in the next world the solace they loved in this. Sometimes as many as five "drawings" are smoked from the

same opium. The leavings of the rich smoker are mixed with the opium sold to the poor; the refuse of the poor is re-smoked by some more destitute; and even the unsmokable dregs are drunk in tea by labourers, sailors and others who have not time to knock off work for a smoke. But notwithstanding this abandonment to opium-smoking, and the fact that extreme excess in this as in other cases brings its punishment, the Szechuan people are described as being stout and able-bodied, and their general health and well-being remarkable, as well as their capacity for work and endurance of hardship. Mr. SPENCE sums up by saying that were Indian opium the fatal scourge it is sometimes asserted to be, there ought to be found in the west of China, where ten times more opium is smoked that elsewhere, a debased, debilitated and impoverished population. But he holds that the reverse is the case, and that the people are both in body and estate amongst the most prosperous in China, and he considers that unless it can be proved that Indian opium contains some noxious principle which does not exist in the Szechuan drug the hypothesis as to the poisonous effects of opium-smoking is open to grave doubt. But it is worthy of remark that Indian opium is almost unknown throughout this vast district.

THE MANUFACTURE OF CHEMICALS IN GREAT BRITAIN.

IF Lord BEACONSFIELD'S dictum be correct, that the prosperity of the trade in chemicals is correlative with the prosperity of the country, there exist signs in the north of England that might be construed as indicative of the decadence of Great Britain. In a special note which appeared in the *Times* a few days since, attention is called to the depression which has now for several years existed in the chemical industries carried on in the Tyne district. The importance of this condition of things will be manifest when it is stated that even now it is estimated that over eight thousand men are directly employed in the chemical works of the Tyne district alone, whilst the value of the total annual production of the chemical trades in the north of England has varied in recent years from two to four million pounds sterling, of which the value of the soda crystals has exceeded three hundred thousand pounds. The depression and consequent enhanced competition have resulted in a remarkable fall in prices, so that it is asserted that for some years past the cost of production of such articles as soda crystals and bleaching powder has been in excess of the selling prices, and serious losses have been incurred. This state of things is attributable to more than one cause, but no doubt began with the reaction from the enormous overproduction that some few years ago was fostered in the district. Another cause no doubt has been the introduction of new processes, especially in the manufacture of soda, which have been found more conveniently applicable in other localities than in the Tyne district. Thus Mr. ALLHUSEN pointed out in a subsequent letter to the *Times* that SOLVAY'S process can be employed to greatest advantage where brine is attainable, as in Cheshire and South Durham, and that under such conditions soda can be profitably produced by this process even at the present low prices. But there is undoubtedly another cause at work which is not noticed in either of these communications. A few years since Great Britain practically manufactured alkali for the world. But in recent years an ever-increasing number of manufactories have been brought into operation in other countries, especially in Germany and Austria, which successfully compete with this country, at least for the home manufacture. It is satisfactory to learn, however, that there are indications of improvement in the trade even in the Tyne district, as prices are tending upwards, although it may be some time before the prices of chemicals may allow of the manufacture being carried on there profitably. In the event of the salt deposit discovered recently in South Durham becoming available for working in the Tyne district it would probably accelerate the improvement.

EXEMPTION FROM JURY SERVICE.

IN accordance with the provisions of the Juries Act lists of persons qualified and liable to serve on juries in England and Wales are now being exhibited on the doors of all places of religious worship in the various parishes, and will remain until Sunday next, the 17th inst. We would, therefore, remind those of our readers who are entitled to exemption under the statute as "pharmaceutical chemists" that if they wish to ensure that exemption it is desirable that they examine the lists relating to their respective parishes to see whether their names have been improperly included. In the event of a pharmaceutical chemist finding that his name has been inserted in the list he may claim to have it expunged on the day of appeal, and to support his application may obtain a certificate of registration from the Registrar. But if he fail to make the claim at that time, he will not be entitled to exemption as long as his name remains on the jury list.

AUTOGRAPH PRESCRIPTIONS.

WE have great pleasure in calling attention to the letter of Mr. W. N. ALLEN, on p. 239, in which he asks for assistance in making a collection of autograph prescriptions for the use of the Irish Board of Examiners. The collection is being prepared under the auspices of the Council of the Pharmaceutical Society of Ireland, and we shall be glad to learn that the request for prescriptions is responded to so liberally that there is not only enough for the purposes of the examiners, but some left that may be made available for the use of students, as, thanks to the exertions of Mr. JOSEPH INCE, is the case in this country.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, September 6, in the College of Physicians, Kildare Street, Dublin, at 3 o'clock.

The Vice-President, Dr. Aquilla Smith, presided.

The other members of the Council present were:—Messrs. Allen, Brunker, Dr. Collins, Messrs. Doran, Grindley, Hodgson, Holmes, Sir George Owens, Messrs. Simpson, Wells, and Dr. Montgomery.

Mr. Hugh Fennell, the Registrar, read the minutes of the last meeting, which were confirmed.

The Registrar read a letter from Mr. James Carse, of Belfast, complaining of the decision which the Council had arrived at with respect to his case and stating that he would take an action against them unless they complied with certain requests which he made in his letter.

The Chairman: His request is limited to a very small thing, namely, allowing him one year.

Mr. Hodgson: I think the simple way would be to refer the letter to the Law Committee and let them deal with it as they think best.

Mr. Holmes: Is there not a threat in the letter against a member of the Council?

The Chairman: It does not appear to be a case for the Law Committee. It is a case for the Council to decide on. He says he has taken advice and will bring an action.

Mr. Allen: I think we should take no notice whatever of his threats.

Mr. Brunker: I move that the letter be marked "read." The Council have spent two whole meetings on his case and a majority have declared their opinion; I do not see any ground for re-opening the matter.

Mr. Holmes seconded the motion of Mr. Brunker, which was put and carried.

The Registrar was directed to inform Mr. Carse of the decision arrived at.

A letter was received from Mr. Thomas R. Lester, of Cork, presenting some prescriptions for the use of the Examiner in Pharmacy.

On the motion of Dr. Collins, seconded by Mr. Doran, a vote of thanks was passed to Mr. Lester.

The Registrar read a correspondence arising out of a letter written by Mr. Alexander Chapman, L.P.S.I., of Belfast, in reference to the acceptance of certificates for compounding by the Royal University of Ireland. Mr. Chapman wrote to the Secretaries of the Royal University, Drs. Meredith and Dunne, on the subject and received from them a letter, dated July 21, 1882, stating that "A certificate signed by a licensed apothecary, attached to a recognized hospital, would be accepted by the University." The Registrar wrote to Mr. Chapman asking for an explanation of the word "certificate," and received from him a reply, dated July 31, stating that "The Royal University required a certificate of having compounded for three months."

The Chairman: We are not to interpret what are the powers of the Royal University. If Mr. Chapman's question were, "Will the certificate of a licentiate of the Pharmaceutical Society be received by the Royal University," we should try to answer it; but having regard to the way in which the questions are put in the letters it appears to be a matter between Mr. Chapman and the Royal University.

Mr. Brunker: But is it not of importance to secure the interests of our licentiates?

Sir George Owens: You can raise the question by asking the Royal University whether they will accept the certificates of our licentiates.

Mr. Brunker: Would it not be advisable for us to place ourselves in communication with the Secretaries of the Royal University in order to ascertain if the certificates of our licentiates will be accepted, the Royal University having adopted the course of requiring from all licentiates in medicine a certificate in practical pharmacy?

Sir George Owens: I think the chances are that they will accept it.

Dr. Collins: All the bodies, the College of Physicians and the College of Surgeons included, require certificates in pharmacy.

Mr. Brunker: The Royal University have gone further, I believe, than any other body. They require a more extended knowledge and experience of pharmacy than other licensing bodies.

Dr. Collins: Should we recommend Mr. Chapman to write to the Secretaries of the Royal University asking if his certificate will be accepted, and in the event of the reply being that it would not, to communicate with us?

Mr. Grindley: Why should we not write to the Secretaries of the Royal University on the subject?

Mr. Brunker moved:—

"That the Registrar be directed to address to the Secretaries of the Royal University of Ireland a query relative to the nature of the certificates in practical pharmacy required by the Council of that body, and to request that certificates signed by duly qualified licentiates of the Pharmaceutical Society of Ireland should be accepted by them."

Mr. Grindley seconded the resolution, which was unanimously agreed to.

A letter was received from Dr. Kaye, Q.C., Assistant Under-Secretary to the Lord Lieutenant, conveying his Excellency's approval of the election of Mr. Charles Evans as Examiner in Pharmacy.

The next subject on the paper was the recommendations of the Pharmacy Act Amendment Committee.

Mr. Allen said at the last meeting the consideration of those recommendations was postponed, on the understanding that they would not be taken up at the present meeting, the Belfast members of the Council having stated that they would not be able to attend it. In justice to those gentlemen it would not be fair to take up the consideration of those recommendations now. He (Mr. Allen) had called on the President and consulted him about the matter, and by his directions he had written to Mr. Pring, Mr. Payne, and Dr. Whittaker to say that the recommendations would not be considered that day.

Mr. Grindley said he could bear out what Mr. Allen had stated, as to the understanding with the Belfast members on the subject.

Mr. Holmes suggested that the recommendations should be taken into consideration at the annual meeting of the Society, which would be held on the 2nd of October.

Mr. Hodgson was of a similar opinion. He observed that there was an attempt in the recommendations to reintroduce the word "apprentice," to which he had a strong objection. He had understood that the principle of apprenticeship was exploded, as far as the Pharmaceutical Society was concerned. It was enough to require two years' practical pharmacy from a man without tying him down by the word "apprentice," whether he were forty years of age or only sixteen. These were considerations that ought to be brought before a meeting of the Society at large.

The Chairman: Then it would be necessary to send out copies of the recommendations beforehand to all the members.

Dr. Montgomery: I do not think it would be possible to enter into these questions at the annual meeting.

Mr. Wells: Can they be brought before the general meeting without having been first brought before the Council?

The Chairman: I should say not, until the Council have first voted on them.

Mr. Wells: These matters have not been voted upon by the Council yet.

Dr. Montgomery said he did not see what the general meeting had to do with these questions. It was the Council who were entrusted with the duty of deciding on them. Propositions might be made from the general meeting, which the Council could not accept, and then they would be in collision with the Society generally. The consideration of the recommendations ought to be adjourned until the next meeting of the Council.

The Chairman: I do not think any inconvenience can arise from adjourning the consideration of these recommendations until the next meeting of the Council. When a Pharmacy Bill is introduced it will be time enough for the members of the Society generally to express their opinions.

Dr. Montgomery: Is it essential that the general body should approve of the action of the Council?

The Chairman: No.

Dr. Montgomery: Or can we make laws without their approval?

Mr. Brunker: It is not a proposal to make laws. These are only recommendations for the amendment of the law. I take it that the Society in general by voting for members of the Council have delegated their authority to the Council, and except in the way of being consulted on important matters have no weight all.

The Chairman: The Council would have power to make suggestions on the occasion of the introduction of a bill, without going to a general meeting.

Mr. Brunker: As public affairs are going at present I do not think there is much chance of our getting amendments in the Pharmacy Act until next year.

Mr. Allen moved—

"That the consideration of the recommendations of the Pharmacy Act Amendment Committee be postponed to the meeting of the Council on October 4, next.

Dr. Montgomery seconded the motion, which was unanimously agreed to.

Some financial business having been disposed of, the Council adjourned.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 215.)

Wednesday, August 23.

The President took the chair at half-past ten, and the first paper read was—

On Some Reactions of Arsenic.

BY W. A. H. NAYLOR AND J. O. BRAITHWAITE.

Three years ago one of us devoted some attention to the action of certain reducing agents on arsenic acid and as a result devised and published a method for the volumetric estimation of this body based upon its reduction by hydriodic acid. First in order among the substances tentatively employed at that time was oxalic acid, which was thought not to have been previously studied in this connection. The result of the experimental inquiry was so far disappointing as to induce the belief that it could not readily be applied to the purpose of reducing arsenic compounds. Subsequently the discovery was made that not only had oxalic acid been tried in this capacity, but that in the hands of the experimenter it had proved a complete success. An account of this interesting observation is given by the author, M. Patrouillard, in the *Répert. de Pharmacie*, iii., 582, an abstract of which may be found in the *Pharmaceutical Journal* for November 27, 1875. His preference for oxalic acid over the reducing agents commonly employed, as sulphurous acid and alkaline hyposulphites, is founded on its solubility and the comparative ease with which it can be obtained in a state of purity. This discovery of Patrouillard received additional importance and credible acceptance when a place was assigned it in a standard text-book of chemistry. In regard to it, the manual referred to has the following statement:—"Arsenic acid is easily reduced to arsenious by the action of reducing agents such as sulphurous or oxalic acid

$$(H_3AsO_4 + H_2C_2O_4 = H_3AsO_3 + H_2O + 2\,CO_2).''$$

These latter opinions contrasted too strongly with the one first quoted to encourage the hope that on mature reflection some ground of agreement would be found. It was therefore resolved when opportunity offered to repeat the old experiments, extend them if necessary, and perform others on the lines laid down by Patrouillard. This we have done conjointly and have pleasure in now submitting the results. Here we would remark that while the author in his communication supplies but little data regarding the mode of testing his reduced compound, he is commendably explicit in his narration of the process intended to effect the desired reduction.

His instructions may be usefully reproduced:—

"10 à 15 grammes du sel à essayer sont dissous dans l'eau distillée, 50 grammes environ; on y ajoute 50 centigrammes d'acide oxalique crystallisé et l'on entretient la dissolution pendant à peu près cinq minutes à la température de l'ebullition; on filtre si cela est nécessaire et lorsque la liqueur est un peu refroidie on l'acidifie assez fortment par l'acide sulfurique. Dans cette liqueur acidulée on fait passer un courant de gaz hydrogène sulphuré. . . . Si le sel essayé contient au moins 2 pour 100 d'arséniate de potasse, par exemple, le précipité jaune floconneux de trisulfure d'arsenic se formera immédiatement."

The following experiments may be cited in illustration of our mode of working:—

Experiment 1.—·25 gram of arsenic oxide dissolved in 50 c.c. of water was boiled for half an hour with ·5 gram of oxalic acid.

Experiment 2 was identical with No. 1, except that the proportion of oxalic acid to arsenic oxide was doubled, and the boiling continued for two hours.

Experiment 3.—Fifteen grams of sodium nitrate containing 2 per cent. of added arsenic oxide were dissolved in 50 c.c. of water. ·5 gram of oxalic acid was introduced and the solution boiled for half an hour. On examining the respective solutions for traces of arsenious acid, negative results were alone obtained. The tests applied in searching for evidences of reduction may be briefly described. The solution was carefully neutralized with ammonia, barium nitrate added to complete precipitation, and filtered. The filtrate was boiled with sufficient sodium carbonate to convert the barium arsenite into a soluble salt, and withdraw from solution the excess of barium reagent. It was then filtered, the filtrate evaporated to a low bulk and divided into three portions. To one was added a little caustic soda, followed by the cautious addition of a weak solution of mercuric chloride. The first drop coloured the liquid permanently yellow. The nature of this reaction will be dealt with presently; for the moment it may be regarded as indicative of the absence of any arsenite. To another portion was applied the copper test in a modified form. In what this modification consists will be described shortly; suffice it to say that no cuprous oxide was formed and therefore inferentially no reduction of the arsenic oxide had taken place. To the third portion, after acidifying with sulphuric acid, a weak solution of potassium permanganate was added. A pink tint was at once imparted to the liquid, which did not become discharged on shaking. Advantage was also taken of the extreme delicacy of iodine as a test for arsenious acid, it being only necessary to substitute the corresponding bicarbonate for the monocarbonate of the alkali employed in effecting the decomposition of the barium arsenite. By its use, too, no appreciable reduction was obtained. As a demonstration that these tests are adequate to the detection of small quantities of arsenious acid, in respect of the conditions under which they were

applied, it may be stated that satisfactory indications of the presence of this substance were afforded by each, when to one of the experimental solutions not more than 4 milligrams of arsenious oxide were added.

Failing to procure any evidence of a reduction, the original experiments were repeated, and another class of reagents applied. These afforded abundant proof of the existence of arsenate. Having removed the oxalic radical and obtained the arsenic compound in the form of an alkaline salt the respective solutions were separately examined. When neutralized they gave a chocolate coloured precipitate with nitrate of silver. With excess of ammonia and magnesium mixture a cloud was instantly produced, followed by a copious crystalline deposit on standing. And when acidified with hydrochloric acid, iodine was rapidly liberated on the addition of a 20 per cent. solution of hydriodic acid.

Experiment 4.—This differed from the preceding ones in that the boiling was conducted in sealed tubes, ebullition being maintained for from five to ten minutes. One tube was opened beneath the surface of clear baryta water, but no tangible proof of its containing carbon dioxide was obtained. Nor did the enclosed liquid respond to the before mentioned tests for arsenious acid.

Experiment 5.—One gram of oxalic acid and ·2 gram of arsenic oxide were dissolved in 50 c.c. of water, and introduced into a small flask carrying a delivery tube depressed beneath the surface of mercury. Having replaced the small volume of air in the flask with hydrogen, a tube containing baryta water and mercury was drawn over the end of the exit tube. The contents of the flask were then vigorously boiled. At the end of ten minutes the baryta water was distinctly opalescent, which was proved to be due to a little oxalate carried over with the steam. No barium carbonate was produced.

Experiment 6.—This consisted in dissolving ·200 gram of arsenic oxide and ·500 gram of oxalic acid in 50 c.c. of water and boiling for half an hour. The oxalic acid was then determined gravimetrically, when it gave the equivalent of ·624 gram of calcium sulphate. A second experiment conducted simultaneously and in precisely the same manner, but omitting the arsenic oxide, gave the equivalent of ·622 gram of calcium sulphate. We conclude, therefore, that under these conditions the oxalic acid suffers no decomposition.

Experiment 7.—Fifty c.c. of a 2 per cent solution of oxalic acid containing ·2 gram of arsenic oxide was boiled for half an hour, and, when cool, strongly acidified with sulphuric acid. Through the solution was transmitted sulphuretted hydrogen. No yellow sulphide made its appearance for the first five minutes, in ten minutes a distinct precipitate had fallen, and it was not until the gas had passed through continuously for four hours that decomposition could be declared complete. The sulphide was collected, dried, digested repeatedly in carbon bisulphide and filtered. The filtrate left, on evaporation, ·006 gram of sulphur.

The pure sulphide was examined in regard to its degree of sulphuration, and was found to exist mainly in the penta-condition. Hence we infer the absence of any indirect action between the sulphuretted hydrogen and the acids by which the arsenic might become reduced. It was now thought that we had arrived at that stage of our inquiry when we might legitimately discontinue our experiments and accept the conclusion to which they unmistakably pointed. We therefore express the opinion that oxalic acid exerts no reducing action under the conditions described by Patrouillard and ourselves.

Passing from this subject we proceed to give an account of our method of employing the copper test. It is based upon the fact of the solubility of cupric arsenate in the double tartrate of potassium and sodium. It is indeed a modified Fehling solution. The copper solution, as ordinarily prepared, cannot be substituted for it on account of the large quantity of double tartrate present which seriously interferes with its delicacy as a test. It should contain but little more double tartrate and caustic soda than would enable it to withstand boiling when diluted with twice its volume of water. Our formula for such a solution has the following proportions:—

Cupric sulphate recrystallized. . .	·200 gram
Water to measure	50 c.c.

Dissolve:—

Tartarated soda, crystallized . . .	·500 gram
Caustic soda	5·00 grams
Water to measure	50 c.c.

Dissolve.

The two solutions are kept separate, and mixed in equal proportions when required for use. The convenience of this mode of employing the copper test is best realized when search has to be made for traces of arsenite accompanied by much arsenate. By this simple modification the arsenate is held in solution, and the inconvenience of filtering a strongly alkaline liquid, or patiently waiting until the insoluble copper compound has subsided, is obviated. Moreover, in our hands it has conduced to accuracy, from the readiness with which the amount of copper desired to be taken may be apportioned. As affording some idea of its capability it may be mentioned that with 1 milligram of arsenious mixed with 2 decigrams of arsenic acid it will give on boiling a decided reduction. Its delicacy is, however, materially impaired by the presence of certain organic acids, as oxalic, citric, acetic, and tartaric. Sulphates and nitrates do not interfere, nor do chlorides, unless present in quantities proportionately large.

As a matter of scientific interest several attempts were made to apply the test volumetrically, but in every case a point was reached at which the copper solution refused to be reduced by the arsenic. Solutions containing various strengths of copper were employed, but not one could be made to yield, in a series of experiments, accordant results. At present, therefore, we are not able to offer an opinion upon its applicability to this purpose.

We now return to consider more fully a reaction which has received from us only a passing notice. We refer to the decomposition which takes place between arsenious acid and mercuric salts. In manuals of chemistry we are informed that when the action takes place between mercuric nitrate and an alkaline arsenite, mercuric arsenite is formed, and that this compound in contact with caustic alkali gives reduced metal. If to these facts be added the two observations of the solubility of this compound in excess of alkaline arsenite and in nitric acid, the most has been said that appears to be known about it. The fact that we have taken advantage of this decomposition by employing it qualitatively as a test for arsenious acid has already been referred to, the only difference being our substitution of the chloride for the nitrate. Here it may be permitted us to offer some remarks on the test itself. When mercuric chloride is added to a solution of arsenious acid only moderately alkaline, the solution remains clear, and upon standing becomes opalescent to a degree dependant on the amount of arsenic present. If, however, the solution be rendered strongly alkaline with caustic soda or potash and then a weak solution of mercuric chloride be added, the mercuric oxide at first produced quickly disappears, leaving as before a clear solution, which rapidly becomes cloudy and if set aside gives a greyish deposit of metallic mercury. Again, if the solution be not only strongly alkaline, but boiling, the liquid will assume a dark colour the instant the mercuric chloride is added. Assuming, for the moment, that the arsenic exists entirely in the higher state of oxidation, the mercuric oxide produced by the first drop of mercuric chloride will colour the solution permanently yellow. Before endeavouring to extend the usefulness of this test by attempts at making it quantitative it was necessary to satisfy ourselves on two points. These were the nature of the steel grey deposit and the condition in which the arsenic existed at the end of the

reaction. That the deposit of reduced metal was free from corresponding oxides was verified by its insolubility on prolonged digestion in a 5 per cent. solution of hydrocyanic acid. That as a result of the action of the mercuric chloride, the arsenious had been wholly converted into arsenic acid, was indirectly proved by its failing to afford any evidence of an arsenite, and directly by the marked manner in which it responded to the tests for arsenates. From a knowledge of these facts we were enabled successfully to apply our test to the volumetric estimation of arsenious acid. For this purpose standard solutions of mercuric chloride and alkaline arsenite were prepared of strengths corresponding respectively to 13·55 grams of mercuric chloride and 4·95 grams of arsenic trioxide per litre. The mode of application consisted in delivering the mercuric solution from a burette into a measured volume of the arsenic solution previously heated to the boiling point, and rendered strongly alkaline with caustic soda. When the mercuric oxide ceased to disappear and from its presence imparted a permanently yellow tint to the liquid, the reading of the burette was taken. Operating in this way we learnt that the reaction took place between 1 molecule of arsenic trioxide and 2 molecules of mercuric chloride. After a little reflection the following equation in two stages was constructed to account for the facts thus far acquired:—

$$As_2O_3 + 2HgCl_2 + 4KHO = 2Hg''HAsO_3 + 4KCl + H_2O.$$

representing first stage of the reaction.

$$2Hg.HAs.O_3 + 6KHO = Hg_2 + 2K_3AsO_4 + 4H_2.O$$

representing final reaction.

Or as one equation

$$As_2O_3 + 2HgCl_2 + 10KHO = Hg_2 + 4KCl + 2K_3AsO_4 + 5H_2O.$$

Confirmatory evidence of the correctness of this equation was supplied by weighing the reduced mercury, and by determining the amount of arsenic acid produced in the reaction. Taking ·015 gram of arsenious acid, the mean of two experiments gave ·097 gram of metallic mercury, theory requiring ·098 gram. From the same weight of arsenious acid was obtained as the mean of two results a quantity of the double magnesium and ammonium arsenate equivalent to ·059 of arsenic pentoxide, theory requiring ·057 gram. Although so far as is known to us no molecular formula has been assigned to mercuric arsenite we consider that in representing it as $HgHAsO_3$ we are acting in harmony with the results of our experiments. The isolation of this body in a state of purity is a task requiring the observance of certain conditions with which at present we confess ourselves but imperfectly acquainted. For instance, if mercuric nitrate be employed as the precipitant, the product is invariably contaminated with mercuric oxynitrate. If in place of the nitrate the chloride be used, followed by the addition of alcohol, a precipitate falls consisting solely of calomel.

We conclude this paper by giving a series of experiments intended to afford an idea of the degree of accuracy of which our volumetric method is capable.

As_2O_3 taken.	As_2O_3 found.
·051 gram.	·052 grams.
·081 ,,	·080 ,,
·061 ,,	·062 ,,
·071 ,,	·070 ,,
·092 ,,	·093 ,,
·076 ,,	·077 ,,
·086 ,,	·087 ,,
·097 ,,	·098 ,,

Equally good results may be obtained in presence of much chloride, sulphate, carbonate, or bicarbonate, but phosphates prohibit its use.

The President proposed a vote of thanks to the authors of the paper, which was carried unanimously. He said this was a paper of considerable importance, and perhaps the most important point was the investigation into the conditions under which arsenic acid and other arsenates were reduced to arsenious acid and other arsenites, for no analyst examining the contents of a stomach, or a piece of wall paper, or anything else, would dare to say that arsenicum was absent until he had not only examined it in the ordinary way by the usual tests for arsenicum but had taken the precaution of adding some reducing agent, in order that arsenates might be reduced to arsenites, and so the possibility of missing arsenic be removed. Probably most who had employed these tests had used sulphurous acid for reducing the arsenates, but M. Patrouillard had stated so distinctly that oxalic acid would do as well, that, inasmuch as oxalic acid was always at hand, whereas sulphurous acid had usually to be prepared, it was not astonishing that many experimenters had gladly accepted the statement, perhaps a little hastily, and used oxalic instead of sulphurous acid. Having a great respect for the French investigator he confessed he had accepted his statement and recommended his students to use oxalic acid, but the denial by Messrs. Naylor and Braithwaite of this reaction was as distinct as M. Patrouillard's assertion, and, therefore, attempted reduction by oxalic acid should perhaps be discontinued until the matter was further investigated. He hoped M. Patrouillard would take notice of this paper, and clear the matter up. He said that after heating with oxalic acid, adding sulphuric acid, and passing sulphuretted hydrogen through the fluid there was an immediate precipitation of dry sulphide of arsenicum, and it would be remarked that he used the word "immediate." The authors of this paper, having done exactly what M. Patrouillard directed, got no precipitate for five minutes, then a cloudiness, and so on, and the precipitation was not complete for several hours. This was not only questioning an inference, it was denying a stated fact, and he hoped M. Patrouillard would make further experiments in order that this important question might be definitively set at rest.

Mr. Martindale said there was a pharmaceutical preparation indirectly connected with the subject of the paper, which he should like to mention, because it had not given him much satisfaction. It was liquor sodæ arseniatis. The preparation, according to the Pharmacopœia, was never satisfactory, and he should be glad to know if Mr. Naylor had ever volumetrically estimated it by any of the reducing agents, such as he had suggested. He had tried to estimate it by means of the volumetric solution of nitrate of silver, without getting good results: it threw down chocolate-coloured arseniate of silver, but it was difficult to estimate when the decomposition was complete, and he had hoped from Mr. Naylor's previous paper that something might be done by the use of the volumetric solution of iodine. The formula in the Pharmacopœia which directed the arseniate of soda to be dried up to a certain degree never gave him very satisfactory results, and he understood from some medical practitioners that they obtained very varying results from the medicine as dispensed by different chemists. If some volumetric test could be given for it, it would be a great help to its being prepared of one uniform strength.

Mr. Kingzett asked if the authors had used oxalic and sulphuric acids in conjunction, which he understood was the process of the French chemist. If sulphuretted hydrogen were used at the same time it would afford an increased facility for reduction taking place, because there would then be something which would combine with the arsenic at the moment of reduction.

Mr. Branson said he found the volumetric method with uranium nitrate or acetate very convenient for the estimation of arsenates, using potassium ferrocyanide as an indicator.

Mr. Naylor said he had never found any difficulty in preparing the liquor sodæ arseniatis, unless the temperature had been allowed to rise a little too high, when there was a danger of the arsenate becoming reduced to arsenite; of course if a very high temperature were used it would become reduced very considerably. As to Mr. Martindale's further question, it had been partly answered

by Mr. Branson. If a volumetric method were desired uranium acetate might be employed, or the method suggested some time ago by hydriodic acid, provided sufficient hydrochloric acid were used at the same time, otherwise there would not be an equivalent quantity of iodine liberated. With regard to Mr. Kingzett's question, he could only say that they followed M. Patrouillard's directions exactly. The arsenic acid was boiled, and when slightly cooled the sulphuric acid was added.

The next paper read was on—

Some Results of the Action of the Digestive Ferments upon Drugs.

BY GEORGE BROWNEN, F.C.S.

I purpose in this paper to call the attention of this Conference to some of the results of the action of solutions of the digestive ferments upon medicinal substances.

Preparations containing the gastric and pancreatic ferments have recently become famous as dietetic auxiliaries; I need not therefore, occupy time with references to peptonized foods or drinks or even give a detailed account of their discovery and development.

In 1836, Schwann applied the term pepsin to an albumen-dissolving product obtained from the gastric juice, and subsequent investigations seem to show that the gastric juice contains more than one distinct ferment, or that this ferment may be modified by the process of extraction, so as to assume new or lose some of its original properties.

This is also true of the ferment or ferments of the pancreas. Bourchardat, in 1845, and Claude Bernard, a few years later, discovered or described some of the properties of the pancreatic secretion. In 1862, Danilewsky asserted the existence of three special ferments in the pancreatic juice, and since that time von Wittich, Kuhne and others have extracted and examined the ferments and applied them to dietetic purposes.

But there is a field of research outside the range of the peptonized foods, which merits the attention of the pharmacist and the physiologist. It is this, What are the possible modifications which drugs may undergo in contact with the digestive secretions, and will an examination of such results be of service in the preparation, combination or preservation of crude material so as to secure the best physiological results?

Solutions of the gastric ferment were obtained from the stomach of the pig, by means of dilute glycerine and also with acidulated water and alcohol. Pancreatic solutions were also obtained from the pancreas of the pig, by means of glycerine and a feebly alkaline, as well as an acidulated dilute alcohol. The first series of experiments were made with these solutions and crude drugs; the second with definite principles.

An infusion of rhubarb, ½ ounce to the pint of water, was prepared and as soon as the infusion had cooled to 50° C., some of the acid solution of pepsin was added and the temperature maintained by means of the incubator for two hours; 47 per cent. of the rhubarb was thus rendered soluble. The mixture was then neutralized by sodium carbonate, the alkaline solution of pancreatin added, and the temperature sustained for two hours longer. The insoluble portion was then found to consist of cellulose and earthy salts, retaining a small quantity of colouring matter. The 240 grains of rhubarb left an insoluble residue of 96 grains.

Infusion of calumba prepared with boiling water and passed through the same processes of digestion, gave somewhat similar results. The spongy cellulose was associated with a trace of berberia; 500 grains of calumba left an insoluble residue of 172 grains.

Cinchona and opium, upon the other hand, behaved somewhat differently; the gummy and extractive matters were dissolved and retained in solution, but a considerable portion of the alkaloids was left in the insoluble marc. Cinchona was about half soluble (48 per cent.) and opium about two-thirds, or 68 per cent. Quinine and morphia could be detected in the respective solutions and were also readily found and extracted from the insoluble residues. The cinchona tannin was destroyed in the digestive process and failed to precipitate gelatine, but this peculiarity will be noticed when we come to the action upon definite substances.

The possibility of the digestive ferments attacking gum acacia was deemed of some importance, in consequence of gum being used in a test demonstrating the acidification of fat by the emulsive ferment of the pancreas. Strong solutions of white gum arabic were therefore prepared and submitted in the incubator to the action of the gastric and pancreatic solutions. The feebly acid solution containing the gastric ferment remained clear even after several hours' digestion. A slight change, however, had occurred in the mixture, as a portion removed, neutralized with soda and boiled with Fehling's sugar test, showed a slight reduction to cuprous oxide, whereas a portion of the original solution undigested, but kept at the same temperature and under similar conditions, was not affected by the glucose test.

The mucilage digested with the alkaline pancreatin solution soon became cloudy, and ultimately a white precipitate was formed. The mixture seemed less viscid than that containing the gastric ferment, and a portion of the solution gave the violet reaction of peptone. The precipitate was found to consist of calcium carbonate, with a considerable quantity of the diastastic ferment carried down by the precipitated chalk. This precipitate, carefully washed, was found to possess strong amylolytic but no proteolytic or emulsifactive power.

I should, therefore, think that the arabin of gum acacia remained unaffected by the processes, and that the peptonizing change was wrought upon some slight impurity of gum, possibly containing nitrogen; this point, however, is reserved for further investigation.

Closely allied in physical character to gum, and holding an intermediate place between foods and medicines, are the mucilages obtained from Irish and Iceland moss. On Irish moss the alkaline extract of the pancreas seemed to exert very little action. The proteolytic ferment of the pancreas extracted with acids soon destroyed the viscidity of the mucilage, and divided the jelly into soluble and insoluble portions. These results were also obtained by the digestion of chondrus jelly with solution of pepsin; the products resembled and perhaps were identical with parapectin and pectic acid.

Cetraria, or Iceland moss, behaved somewhat differently. A jelly of this substance retained its colour, but became flocculent when acted upon by the gastric ferment. On the other hand, the pancreatized jelly retained more of its viscidity, became deeper coloured, and gave a deposit of yellowish-white flakes. These flakes under the microscope were found to consist of non-crystalline masses (pectic acid?).

The digestives were found to produce or accelerate the pectic fermentation by some experiments upon the pectin of the turnip.

I must now leave the consideration of this part of my subject and call your attention to the action of the ferments upon more definite substances. The acidulated extract of the gastric juice decomposed a watery solution of salicin very slowly and imperfectly; saliretin was formed, but it was associated with undecomposed salicin. On the other hand, the pancreatic ferment split up the salicin into saligenin and glucose, and the saligenin separated by solution in ether and subsequent crystallization was obtained in the form of white laminæ or scales.

A well-washed sample of jalapin remained intact after digestion with the pepsin solution, but pancreatic digestion withdrew a copper-reducing substance from the jalapin.

Santonin was unaffected by gastric and pancreatic solutions.

A solution of tannin treated with the acid pepsin solution became turbid, but the turbidity disappeared when a little more hydrochloric acid was added to the mixture. The results of several hours' digestion were, however, negative, but the pancreatic ferment, upon the other hand, rendered the tannic acid incapable of precipitating gelatine or isinglass, because of the transformation into gallic acid.

These are a few of the results obtained by digesting drugs with extracts from the digestive organs; they throw open a wide field for the pharmacist, and one deeply interesting to the physiologist.

The digestive process seems to consist of the hydration or splitting up of insolubles, and, as far as my observation has gone, the microzymous or bacteroidal fermentation need not occur until the primary digestion is in an advanced stage. For instance, in the digestion of the proteids, albumen and fibrin, I have noticed occasionally a point when the solution or hydration of these substances by the acidulated pancreatic secretion passes into the formation of leucin and tyrosin. I refer to the acidulated pancreatic solution, as the researches of Dr. Roberts and others upon the amylolytic power of a neutral or feebly alkaline pancreatic extract have seemed to throw into the shade the proteolytic power of acidified pancreatic juice, which, although incapable of transforming starch paste into sugar and dextrine, yet still possesses the power of dissolving fibrine or albumen, and ultimately splitting them up into leucin, tyrosin, and an organic acid. This is not the result of the putrid fermentation of albuminous bodies, as in this latter case the formation of ammonia renders the reaction alkaline instead of acidulous.

The emulsive ferment as well as the proteolytic in action produces acidity, although in the emulsification of fat the acidity is generally very slight and insufficient by itself to account for the minute subdivision of large proportions of fat. In the digestion of proteids the acidulous body is glutamic acid, and I think it may also occur in the emulsification of fats, as I have often sought for fatty acid and glycerine as separate bodies in emulsified fats; but I have always failed in my attempts to obtain any proportionate quantity which would justify me in ascribing emulsification of fat to their formation and presence.

The President proposed a vote of thanks to Mr. Brownen, which was carried unanimously. He said the results which Mr. Brownen had described were extremely important, and they must all hope that he would continue to work on this very large field of investigation. Ferments or septics, on the one hand, and antiferments or antiseptics, on the other, were now largely administered to human beings, while very little indeed was known of their action or the extent to which they retarded action when thus introduced into the system.

Mr. Benger said the members of the Conference were much indebted to Mr. Brownen for having initiated this very original line of investigation on the action of the digestive ferments. His results were sufficiently interesting to warrant them in hoping that they would get something still more definite in future. The paper would, however, have possessed additional value had it given a few comparative results. Taking, for instance an infusion of rhubarb. Mr. Brownen said that, after digesting rhubarb with an acidulated pepsine solution and then with an alkalized pancreatic solution, there was nothing left but 96 grains of cellulose and earthy salts out of 240. It would be interesting to know if, had the rhubarb been digested with water only, or with acidulated water and then with an alkaline solution in succession, any different result would have been obtained. If he had tried that experiment perhaps he would state the result. The same with reference to the calumba: of course there would in this case be an action of the pancreatic ferments on the starchy matter, as Mr. Brownen prepared the infusion with hot water instead of cold as the Pharmacopœia directed. Another statement he should like to make a remark on, was:—That an acidulated pancreatic solution had no amylolytic action, but only proteolytic. That was quite contrary to his experience. He had always found a slightly acid solution both amylolytic and proteolytic, quite as much so as a neutral or alkaline solution. In Dr. Roberts's process for the peptonization of milk, carbonate of soda was ordered to be added, not with a view of increasing the action of the pancreatic ferments, but to prevent the precipitation of metacaseine, should the patient boil up the milk before the completion of the digestive process, which he was generally directed to do. If it were rendered alkaline no precipitation took place.

Mr. Kingzett said the same thing had occurred to him, in listening to this interesting paper, as had been mentioned by Mr. Benger. For instance, taking salicin: if it were boiled with a dilute acidulated solution the compounds mentioned by Mr. Brownen would be obtained, viz., glucose and saligenin. It would be important to know how far the action observed was due to the ferments themselves, as distinguished from the alkali or acid severally employed. So far as regarded the splitting up of albuminous substances, the results mentioned were in agreement with those formerly worked out by Schützenberger, who had proved conclusively that albumen, when subjected to the action of hydration by ferments, or hydrolysis by baryta water or dilute sulphuric acid and so on, was split up into the two lesser molecules, hemiprotein and hemialbumen, one soluble and the other insoluble, though the insoluble part becomes soluble on further hydrolysis. On continuing the process these subsidiary molecules are further split up, yielding more ultimate products, including some of those mentioned by Mr. Brownen, viz., glutamic acid, aspartic acid, tyrosin and leucin, etc., which substances were always formed as ultimate products of the hydrolysis of albuminoids induced by chemical agencies or bacteroidal life.

Mr. Plowman said everyone must feel that in experiments of this kind the exact condition of things could never be obtained artificially in the laboratory, such as occurred in the human body, in which a mysterious factor, "vital action" or "vital force," exerted its influence. He maintained, however, that as far as possible they ought to imitate the conditions which existed in the human body. As an instance of the importance of this, he remembered a most interesting paper being read by Professor Redwood at an evening meeting of the Society, in which he showed that when so-called "dialysed iron" was poured into ordinary water the iron was entirely precipitated, and that when that precipitate was dissolved in hydrochloric acid a solution was obtained which would not dialyse. If the idea were entertained that absorption of medicines was simply, or even mainly, owing to diffusion, this experiment seemed to show that dialysed iron would be worthless as a medicine; but it had been proved by medical men by actual observation that anæmic patients taking dialysed iron had had their condition considerably improved. As to the conditions which Mr. Brownen observed, the first thing that attracted his attention was that he performed these experiments at a temperature of 50° C., which of course was never reached in the human frame. At such a temperature as that any dilute acid solution would have a tendency to break up such bodies as salicin, independently of fermentative action. Another thing to be remembered in experimenting with pancreatic juice was this: the biliary secretion and the pancreatic secretion were discharged into the intestinal canal at a common orifice, and it was by no means determined what were the exact functions which the biliary secretion and the pancreatic secretion respectively fulfilled in the process of digestion. He should be glad to see some experiments performed in which the biliary was mixed with the pancreatic secretion, so as to ascertain the actual effect of the two secretions together. Mr. Brownen prepared an alkaline solution of the pancreatic secretion and

also a dilute alcoholic solution, but he did not say which he used in these experiments; he should be glad to know which was used, or if both, if similar results were obtained. With regard to the violet reaction of peptone mentioned by Mr. Brownen, Mr. Plowman said there was a special product obtained by the action of the pancreatic secretion on proteids, which gave a violet reaction with chlorine; and there was the common reaction of peptones, which was obtained by adding cupric sulphate and an excess of caustic potash. When a very small quantity of sulphate of copper was added, a red coloration was produced, but with an excess of the sulphate a violet colour was produced. He should be glad to know which reaction Mr. Brownen referred to. Because he got this violet reaction, Mr. Brownen supposed that there was some nitrogenous impurity in the gum which produced it, but as a matter of fact pancreatic juice contained albumen in some considerable quantity and an intrinsic digestion of itself went on immediately after it was secreted, by which peptones were produced, so that the pancreatic juice of any age would itself give the peptone reaction. With regard to the action of the acidified solution, he would remark that as a matter of fact large quantities of undigested starch pass from the stomach into the duodenum, not being converted into glucose or dextrine by the saliva. There was no doubt further, that the contents of the stomach were not immediately neutralized by the biliary and pancreatic secretion, and, therefore, it would be useful and economical for the ferments in the pancreas to be capable of acting on starch, while the contents of the intestinal canal were still slightly acid. Further, it was proved that the actual body existing in the perfectly fresh and still warm pancreas had very little proteolytic action, and to that hypothetical body existing in the pancreas the term zymogen had been given. On keeping the pancreas for some time that zymogen was split up into the proteolytic ferments and that change was also brought about very readily by dilute acids.

The President said there was one point mentioned by Mr. Plowman which it would be out of order for the Conference to discuss, and that was the question of vital force. On any other portion of this interesting subject he should be glad to hear further discussion.

Mr. Groves suggested that when Mr. Brownen continued his experiments, he should try the action of these ferments on each other. It was often the practice to give the pancreatic ferment and the peptic at the same time, but he thought it not unlikely that they might digest and so destroy each other. As Mr. Plowman had remarked, in the economy of nature they were added successively, first ths saliva, then the gastric juice, then the pancreatine and then the bile.

Mr. Atkins said that, bearing in mind the President's caution, he had only one remark to make and that had no reference to the moral question or the one which was open to discussion. It was simply this, that in all these experiments it must not be forgotten that there was a vital force, though they could not go into the question of its origin or nature.

The President said they must not even have any discussion whether there was or was not such a force.

Mr. Atkins said he remembered that some years ago in America, some very interesting experiments illustrative of the processes and results of digestion were made on an Indian who had had a portion of his chest shot away; those experiments were conducted in the stomach and outside it, by the same agents, and wonderfully different results were obtained. Another familiar illustration of the same thing was, that if you wanted to make sea water, you might ascertain by analysis the ingredients of sea water and add them to fresh water, but you did not get the same result. In nature's laboratory there was something or other which made all the difference between artifical sea water and natural. One very interesting point in connection with this paper was as to the development of bacteroidal life. He understood that if the result of the processes of digestion were acid rather than alkaline, that development did not take place. This was an extraordinary fact, which was one rather for medical men than pharmacists to consider, but it was very interesting, and if it at all lay in the direction of Mr. Brownen's future experiments, he hoped he would pay some attention to it. If in the process of digestion there was an acid result, it was followed by an immediate extinction of that form of life which otherwise, perhaps in a few minutes, would be very largely developed.

Dr. Symes said he had made a note to ask the same question as Mr. Benger had put, because it struck him that the amount of residue was such as might be expected if the infusion had remained without the addition of the ferments. He should like to say, too, that this was rather a difficult investigation, inasmuch as, leaving out the vital force, these things were given, not to people in health, but to those who were sick, and consequently the results were not the same if one were experimenting on a healthy person. It was desirable, also, to follow as closely as possible the mechanical conditions which surrounded the use of these medicines. He remembered the case of the dialysed iron referred to by Mr. Plowman; on that occasion Professor Redwood had mixed the dialysed iron with peptone and had allowed it to digest for two hours in a glass bottle before attempting to dialyse it, and he pointed out then that he was not following the process of nature, under which a person began to digest the dialysed iron immediately it was mixed with the ferment, and the surrounding tissue was not a glass bottle, but the stomach, from which a certain amount of diffusion took place. All these points required consideration in prosecuting this study; he thought, too, that more satisfactory results might be obtained if the investigation were carried on, using diastase, than the animal ferments.

Mr. Kingzett said the discussion ought not to close without reminding Mr. Atkins that the biliary secretion was not acid but alkaline.

Mr. Symons asked if Mr. Brownen had tried the action of these ferments on starchy matters.

Mr. Brownen, in reply to the question put by Mr. Benger, said that at the same time that the experiments were made in the incubator they were also conducted on both acid and alkaline solutions of rhubarb, so as to control the tests. This would also apply to the remarks of Mr. Kingzett, because although he found that at the end of the time there was a small quantity of salicin split up by a temperature not exceeding 50° C., yet the greater portion of the salicin remained unaltered; he therefore presumed that the secretions had to do with the change which had occurred in the solutions he was then testing. A feeble acid solution was unquestionably amylolytic, but the amylolytic ferment acted more powerfully in an alkaline or neutral solution than the feebly acid solution; and if the acidity exceeded 2 per cent. it was almost completely neutralized or destroyed. Whether it could be reproduced again remained to be decided by further experiment. The temperature of 50° C. was adopted because it was the one at which he found the gastric and pancreatic ferments acted most rapidly without decomposition, though it ran very near that point. He therefore adopted that temperature, and never exceeded it, but many of his experiments were made at a much lower temperature, that of the human body, about 98° F. He used the higher temperature in order to obtain the maximum result of salicin, which he found was slowly decomposed even by the gastric ferment as well as by the pancreatic, and he wanted to get, within a reasonable time, the maximum amount of work from those ferments. The solutions used were a mixture of alcohol and water rendered slightly alkaline in one instance for pancreatine, and then rendered distinctly acid in the other case, so as to obtain an acidulated solution; the amount of alcohol and water being the same in each case. The glycerine experiment was

made in order to see what the action would be without either alkali or acid. He used also, working in the laboratory of Messrs. Savory and Moore, their acid elixir and the neutral essence, testing them side by side with these other solutions, but he had not mentioned this in the paper, as he wished to avoid all trade reference. The violet reaction he obtained was with the copper solution, and not with chlorine. He tested the solution of gum, because in the lectures which Dr. Gamgee gave at the Royal Institution, he laid great stress on an emulsion of almond oil perfectly sweet, and the action upon it of a feebly alkaline pancreatic extract, which in a very short time became distinctly acid. He wanted to find out whether that acid was derived from the gum or from the oil, and he found that it was not derived from the gum, but from a small portion of the oil going into the acidulous state; but there was this other substance which he supposed was a constituent of gum, not perhaps an impurity, but an invariable constituent of the best white gum, acted upon, although the arabin was not acted upon by these secretions. Although these ferments seemed to act, one in an acidulous condition, and the other best on starch in an alkaline condition, yet they seemed as they passed the duodenum to become rather alkaline than acid. Some extracts of food he had obtained in different degrees of digestion, and also in some experiments in which he had tried to simulate the digestive processes (*minus* the vital force, which was objected to), had led him to the conclusion that the bacteroidal fermentation need not occur in any of the conditions necessary for digestion. In fact, there seemed to be a point in the digestion of the proteids analogous to the transformation of alcohol into acetic acid. These bacteroidal forms set up putrid fermentation which would invariably tend towards alkalinity rather than acidity. On raw starches he found very little action; that was why he boiled the infusion of calumba, contrary to the ordinary Pharmacopœia directions. He supposed the compilers of the Pharmacopœia wished to get rid of the starch, but in his experiment he wished to obtain the maximum action on cooked substances.

The next paper read was entitled—

Remarks on the Root of Aconitum Napellus and other Species.

BY E. M. HOLMES, F.L.S.

Although aconite has been used in medicine for at least a hundred years and is recognized as one of the most powerful of medicinal agents, its internal use is not quite so general in this country as its properties might lead us to expect. Perhaps this is owing to variation in strength of the official preparations and to the known danger of using too large a dose. How far this variability is due to a non-recognition in the Pharmacopœia of well-known facts, may be open to question, but it appears certain that the requirements of that book might be complied with, and yet that preparations very variable in strength might be the result. That such is the case is proved by the statements made by Mr. Cleaver concerning extract of aconite (*Pharmaceutical Journal*, [3], xii., 722) and by the recent experiments made with the alkaloid, which have shown that one commercial sample may be seventy times stronger than another.

The Pharmacopœia describes aconite root thus:—

The dried root of *Aconitum Napellus*, L. (*Pharmaceutical Journal*, [1], xv., 449). The root may be "imported from Germany or cultivated in Britain and collected in the winter or early spring, before the leaves have appeared."

In the first place the figure of the root referred to is totally inadequate to distinguish the root of *A. Napellus* from that of other less poisonous species, the variation in form being very great, according to the age and position of the root. In the second place the root imported from Germany is collected by peasants who, as a rule, are not possessed of botanical knowledge, and is sold without any guarantee that it is collected in winter or early spring; indeed it is difficult to understand how the root of *A. Napellus* could be found before, or distinguished after, the leaves have appeared. Thirdly, the root is not cultivated as a crop in this country, because it could not compete in price with the German drug.

Under these circumstances it is easy to understand why the alkaloid of commerce varies in strength and why the preparations are also liable to a similar fault. It is also obvious that even the most careful chemical investigations of the commercial root must be founded on an unreliable basis, and that the results obtained by chemical analysis must in consequence be to a certain extent devoid of scientific value.

It becomes extremely important, therefore, that so powerful an agent should receive at the hand of the pharmacist far more attention than has hitherto been accorded to it, and that every means should be used to provide the medical profession with preparations of aconite as nearly as possible of uniform strength and perfectly reliable. This is the more desirable since aconite is now being used in the treatment of inflammation of the lungs, in puerperal and other fevers, and in acute cases in which prompt and reliable action is of the utmost consequence. The chief difficulty in making such a preparation is in obtaining the typical variety of the right species. De Candolle describes twenty-nine varieties of the official species, *Aconitum Napellus*, but whether all these forms, which possess the same specific botanical characters in common, have the same chemical constituents, and whether, like isomorphic crystals and isomeric bodies in general, they have a different physiological action, is very difficult to ascertain, seeing that it is by no means easy to identify them for the following reasons:—First, because a complete series of the members of the genus is hardly to be found for reference in any botanical garden or museum; secondly, because the varieties sold by florists are not always carefully named; and thirdly, because they cannot be procured in sufficient quantity for purposes of chemical investigation.

Moreover, botanists are not agreed as to the forms which should be placed under each species. Steudel enumerates about eighty which have been grouped under *A. Napellus* by different botanists. The aconites are so closely allied, and the varieties run so much into one another, like the willows, brambles, roses, mints, and cinchonas, that even De Candolle has placed the same plant under two varieties. Professor Maximowicz, who has paid considerable attention to the species occurring in Japan, remarks in a recent letter,—"The genus *Aconitum* is, botanically speaking, a most difficult one, not one characteristic holding its own from species to species. It is a matter of personal opinion, whether you accept a dozen species in all, while another thinks to separate thrice the number. I have observed them in Mandshuria and Japan very assiduously and have despaired of finding well defined species, for there will arise intermediate forms between such as in most cases are thoroughly different. One would think these were numerous hybrids, but they are as freely seed-bearing as the various hybrid aquilegias used to be."

Although it is almost impossible to define accurately in botanical terms the different aconites, it seemed to me worthy of inquiry whether those available for pharmaceutical purposes might not be characterized sufficiently for all practical purposes. It is well known that the Japanese peppermint plant, although botanically it offers no character to separate it from *Mentha sativa*, is readily distinguishable by taste, and it is, therefore, natural to suppose that the different forms of aconite might be distinguished to a certain extent in the same way. Experimenting in this direction I found that the roots of several species of aconite did not cause a tingling sensation when chewed, and that this was the case not merely with the Asiatic species, *Aconitum uncinatum*, *heterophyllum* and

palmatum, but that also several plants which present the specific characters of *A. Napellus*, although easily distinguishable from it by habit, present the same peculiarity. Of these I may mention that forms which were supplied to me under the names of *A. Napellus*, var. *pyramidale* and *paniculatum*, etc., did not cause tingling when chewed, while others, such as *Stoerckeanum* and *albiflorum*, produced a slight, and others again, such as *A. autumnale*, a very powerful tingling sensation. Here a difficulty is met with in the fact that the plants are not always correctly named, either in botanical gardens or in the collections of florists, from labels becoming displaced. But all of the aconites in which this variation occurs, so far as I have observed, flower later than the typical *A. Napellus*, so that if the Pharmacopœia added to its description "the root obtained from plants flowering in May and June," and erased the words "imported from Germany," one cause of the unequal quality of the root would be removed. This is all the more important, since I have determined by direct inquiry that some florists would supply to a grower the plant flowering in May and June, and others would supply any variety of *A. Napellus* that happened to be in stock, no difference in the properties of the varieties being known to them. The only way to secure aconite of good and uniform quality appears to be to limit the official drug to home-grown aconite flowering in May and June and gathered when the plant is in flower. In this way there can be no mistake about the species, and the leaves collected at the same time could be used for making extract. Even if the root were thus not gathered in its most active condition, it would at all events have the advantage of uniformity of strength, which is of much more importance.

The aconite has the property of developing roots instead of leafbuds in the axils of the lower leaves, provided that these are covered with soil. Whether this property has been conferred on the plant with the view of enabling it to approach nearer to the surface when, as must often happen in its native mountains, the plant becomes almost buried by the fall of *débris*, or the earth washed away from the root by floods, or to propagate the species when not under favourable conditions for producing seed, it could at all events be turned to account in cultivation, since by earthing up the stems a larger yield of roots would probably be ensured.

In testing aconite root by taste it must be remembered that the tingling sensation is often not developed for ten minutes and lasts for two or three hours, so that half a day must be allowed to elapse before tasting a second sample, to prevent the chance of confounding the effect of one root with that of the next.

In conclusion, aconite is very easy of cultivation, and considering the small quantity used there is no reason why any chemist who has a small piece of garden should not grow his own aconite root.

The President, in proposing a vote of thanks to Mr. Holmes, which was carried unanimously, said his suggestions with regard to drugs were always acceptable, and these now given would doubtless have full consideration.

The next paper read was on—

Ammoniated Extract of Ergot and a Process for its Preparation.

BY A. W. GERRARD, F.C.S.

For ten years or more I have known a preparation bearing the above name; how long before this it had been in use or to whom it owes its origin, I can give no information.

My earliest practical acquaintance with this extract dates some five years back, about which time I was asked by one of the then obstetric assistants to University College Hospital to prepare some for him, as he wished to try it, having seen it used successfully in a general practice. In the absence of any published or private formula to guide me it was left to my discretion to follow such a process as I thought best suited for the object in view.

I premised at starting my experiments, that the preparation to have any good right to the name it bears should have ammonia employed in some form or other as the solvent of the extractive matters of the ergot, and not that the ammonia be merely added after an aqueous extract had been made. For this purpose the solvents that appeared most available and worthy of trial were aromatic spirit of ammonia, and solution of ammonia.

From a first consideration of the requirements of the case it seemed easy to frame a process that ought to give a satisfactory result, but practice proved the contrary. No difficulty was experienced in producing an active therapeutic agent, but a good deal of trouble had to be taken before an elegant or presentable pharmaceutical preparation resulted.

Experiments with Aromatic Spirit of Ammonia as the Solvent.

First experiment.—Ten ounces of well-crushed ergot was moistened quickly with the spirit and packed in an air-tight percolator, more of the spirit was added till 10 ounces was reached. Percolation proceeded very slowly, in twenty-four hours less than 1 ounce of percolate had passed; displacement was now resorted to by means of water, but the process went on so slowly that after four days only 5 ounces of percolate was obtained, meantime the displacing column of water had become strongly alkaline from the diffusion into it of the ammonia. The experiment was stopped.

Second experiment.—The same quantity of ergot was employed, but it was packed looser in the percolator, and 20 ounces of the aromatic spirit poured over it in several portions; percolation was still slow, but more rapid than in the first experiment; 9 ounces of percolate was obtained, very high coloured and rich in extractive; on attempting to displace the remainder of the spirit the same difficulty arose as in experiment No. 1.

If the second experiment had been successful I intended to have followed a process of repercolation, but the difficulty of displacement, and consequent waste of material, made it evident that the process would not answer. Therefore no further experiments were undertaken with this solvent.

Experiments with Ammonia Water as the Solvent.

First experiment.—Ten ounces of crushed ergot was treated with 50 ounces of water to which 1 per cent. of strong solution of ammonia had been added; on contact of the ergot and ammonia a marked deepening of colour to a purple was observable, this being the usual reaction of alkalies upon the colouring matter of ergot; at the same time an almost immediate softening of the drug is apparent, it being evident that water in the presence of the alkali rapidly penetrates its tissues. This action as compared with that of water alone is very marked, and although it produces a rapid removal of the extractive, it exercises an influence detrimental to percolation; the ergot swelling and softening so much as to assume a half colloid state, unsuited for the filtration of the solvent. Under these conditions the exhaustion of the ergot was so slow as to make it evident that the ammonia was present in excess and a weaker solution should be tried.

Second experiment.—The same process was repeated as in the last experiment, using a ½ per cent. solution of strong liquor ammoniæ. Here the action was similar to that described in the last experiment, but much less in degree, and not enough to prevent percolation proceeding in a satisfactory manner. Thus the exhaustion of the ergot by means of an ammoniacal solvent was accomplished, and after a few further experiments the following formula was formed:—

Formula for Ammoniacal Extract of Ergot.

Take 10 parts of crushed ergot, macerate it for eight or ten hours with frequent stirring in 50 parts of cold water, containing ½ per cent. of strong solution of ammonia; then throw it upon a flannel strainer, and allow it to filter. Wash the ergot from time to time with more ammoniacal water, till sufficiently exhausted. The filtrate, which is somewhat turbid, is evaporated to 5 parts, any scum or fat rising to the surface being carefully removed. The extract when cool is treated with an equal volume of aromatic spirit of ammonia, and the product set aside until subsidence is complete; the clear portion is then decanted and the residue filtered through felt or flannel, washing the deposit with a little more spirit, so as to bring the volume of the extract to 10, 1 part fluid thus containing the soluble matter of 1 part solid of ergot.

In appearance this extract is much darker in colour than the ordinary form, the odour is mainly ammoniacal, and the average specific gravity 1000.

A sample I have kept for nearly a year does not appear to have undergone any change. The dose is the same as the ordinary liquid extract.

In studying the above process it may strike some observers as somewhat curious to use ammonia as a solvent, and then to dissipate it by evaporation, but it must be remembered that the ammonia is not eliminated until its work has been accomplished, and what therapeutic action it might have exerted is compensated for by the addition of the aromatic spirit.

In the process of manufacture, whilst evaporation is proceeding, it will be noticed that not only albumen and colouring matter separate but a considerable quantity of oil. The presence of this oil is accounted for by the formation of a soap between the ammonia and ergot fat during maceration, the soap remaining in solution whilst cold, but being decomposed by heat.

This extract, as regards its therapeutic value, has had a thorough trial in the obstetric department of University College Hospital, and has given general satisfaction, Dr. John Williams, one of the obstetric physicians, having requested it to be substituted for the ordinary extract in such mixtures as contain ergot.

To enter into a discussion as to why ammonia improves or increases the action of this drug is scarcely within the domain of pharmacy, and published therapeutic memoranda on this point are wanting. From inquiries I have made, it appears, as the result of numerous observations, that the ammonia developes a rapid action of the drug by acting as a nervine stimulant, which action is very useful during that period when the patient has to undergo that painful and trying ordeal for which ergot is so extensively employed. To this must be added the great solvent power of the ammonia, which ensures a most complete exhaustion of the active principles of the drug.

The PRESIDENT proposed a vote of thanks to Mr. Gerrard, which was carried. He said he was glad to find that Mr. Gerrard had had the courage to publish his failures as well as his successes, as such a course rendered a paper far more useful to future investigators. Their knowledge of the shoals of the sea of pharmacy, as well as of its depths, could not be too thorough.

Mr. STUART asked whether it was not possible, with so small an amount of ammonia, that the whole of it might form a soap with the oil, and hence be neutralized, and whether an equally good result would not be obtained from a simple aqueous extract. He understood this was a superior preparation to that of the British Pharmacopœia, and he believed that in many quarters amongst medical men the British Pharmacopœia formula had for obstetric purposes fallen into discredit. If this ammonia process were a good one it would be a distinct gain to pharmacy and to the medical profession. In the United States Pharmacopœia since 1860 an acid extract of ergot had been used. Dr. Squibb was one of the originators of the process which included the maceration of the ergot with dilute alcohol in which there was a little acetic acid. He noticed in the report which the President read as to the proof sheets of the new Pharmacopœia that that acid was now exchanged for hydrochloric acid, but the Committee still adhered to the acid preparation, and in his experience, having made from the original formula large quantities of the preparation of ergot, that was immensely superior to the British Pharmacopœia process. It was a curious thing that apparently both an alkaline and an acid preparation should produce good results, but the chemistry of ergot was, notwithstanding all the investigation which had taken place, still in an undecided state.

The PRESIDENT remarked that in the formula of the United States Pharmacopœia now being issued, not only was hydrochloric acid substituted for acetic acid, but the glycerine formerly used was omitted.

Mr. STUART thought from his experience that that would be an improvement.

Dr. SYMES said all these investigations tended to show that water was really capable of extracting the active principle of ergot. He thought it had scarcely ever been questioned that the formula of the British Pharmacopœia really worked admirably. He did not understand Mr. Gerrard to claim that this was a superior preparation, but what he found was that certain ammoniated preparations were put forward by certain houses as being the original, the only genuine, and all that kind of thing; that they varied considerably in appearance from very pale sherry to a dark blackish colour; that he with many others had been rather surprised that all should be the original and the best, and had, therefore, investigated the subject. They were much indebted to him for so doing. He certainly thought in using the small quantity of ammonia that he did it was quite possible that a soap was formd, but that would only have the effect of removing a certain amount of oil from the ergot, and enable the water to act more freely than it otherwise would do; he would probably have alkaline soap acting on the ergot.

Mr. MARTINDALE said he had been asked to make an ammoniated preparation of ergot for a medical practitioner, who told him that he had some which was much more active than he had ever been supplied with according to the British Pharmacopœia. That was eight or nine years ago, and since that he had continued to make a very satisfactory preparation. He could quite corroborate what Mr. Gerrard said that ammonia either in an aqueous or somewhat mixed aqueous and alcoholic solution had a powerful action in abstracting the active properties of ergot, making a strong dark brown solution immediately, but he thought Mr. Gerrard's process was a little too complicated. He did not adopt anything like so complicated a process; he used about equal parts of spirit and water mixed with one-eighth of solution of ammonia, which he percolated through the ergot in fine powder. The first product was set aside, the latter product evaporated to a certain small bulk, and then mixed with the other. He thought it was better to use an ammoniacal preparation of this kind rather than the one made with sal volatile as given in the new London Hospital Pharmacopœia. There the ergot was treated first with sal volatile, and after percolation to a certain extent the first product was set aside and the marc treated with so much water heated up to 160° F., so that it proceeded somewhat on the lines of the British Pharmacopœia process; this second product on evaporation was added to the percolated portion. There was no question that ammonia was a very powerful solvent, much greater than simple water, of the active properties of ergot. He had made a preparation according to the American Pharmacopœia, and the acetic acid solution there had undoubtedly a similar action to the ammonia in the process now described. He certainly did not think the British Pharmacopœia process was a good one; it never yielded really good results in his hands.

Mr. Parker thought that in the present state of knowledge of the chemistry of ergot they were working somewhat in the dark in devising formulæ for its preparations. It was not known upon what exact constituent the activity of ergot depended, and therefore, they could not work out a process based on their knowledge of its chemistry. That being the case, before drawing any conclusions as to whether simply an aqueous, an acid, or an alkaline extract was best, they should start with a certainty as to the quality of the drug operated upon. Many drugs, ergot and cantharides especially, varied very much in quality according to the manner in which they were collected and stored. A good sample of ergot after being kept some time, unless very carefully kept, might be entirely deteriorated; therefore, the first thing to do would be to prove the activity of a sample of ergot; then from the same sample prepare an aqueous, an acid and an alkaline extract, and have them submitted to a comparative therapeutical examination.

Mr. Greenish said he felt very much indebted to Mr. Gerrard for bringing this subject before the Conference, and if the amended preparation of ergot was not medicinally more active, which he was disposed to question, at least, the paper possessed considerable interest from the fact that this had hitherto been regarded as a secret preparation. He was not at all prepared to accept the statement that this preparation was better than that of the British Pharmacopœia. He recollected that Blumberg, who had paid great attention to ergot, had stated distinctly that water was quite sufficient to extract the active principles. Now, if a man like that, who had paid perhaps greater attention than anyone else to ergot and to the isolation of its active principles, had arrived at that conclusion, he thought they were justified in adopting it. Professor Dragendorff, who had also paid great attention to the subject, found that water was quite sufficient to extract the active principles. He should like to have heard from Mr. Gerrard the results of some more comparative trials by medical men of the two preparations, and he suggested that in experimenting upon ergot he should extract the fat from it previous to applying any menstruum.

Mr. Hampson said they were all much obliged to Mr. Gerrard for the formula he had given, because they wanted one to satisfy the demands of their medical friends, but he very much doubted if it were really any improvement on the former preparations. He could speak from direct knowledge of the efficacy of the British Pharmacopœia preparation in an institution with which he was acquainted, where that preparation, well prepared, was used and was always satisfactory.

Mr. Martindale said no doubt water in itself was a good solvent, but the disadvantage was so much of it was required; the amended preparation could be prepared with very much less bulk and without having to evaporate it down for such a length of time.

Mr. Plowman said there was one more point in connection with ergot which must be borne in mind; in the British Pharmacopœia process the oil was extracted with ether and rejected. Now, it was not proved by any means that that oil was inert, and so late as 1881 a paper was published in which amongst other things it was said to "constringe the blood vessels," and it was possible that a hydrochloric solution might extract the principle which was by the British Pharmacopœia process taken out by the ether and rejected. In Mr. Gerrard's process, in which a scum was formed which was skimmed off, some of the active principles might be withdrawn. He should like to know whether that had been rejected definitely without any experiment being tried to ascertain if it possessed any activity.

Mr. Schacht thought this question had been answered very elaborately within the last few years by a French authority. Two memoirs of considerable detail had been published by two different medical authorities about the various properties and powers of the different principles of ergot. In the one he remembered perfectly well that very considerable remedial power was attributed to this oily constituent of ergot, whilst a later writer on the subject contradicted almost word for word the opinions expressed by the previous chemist on that point. He thought Mr. Parker was right in his caution about elaborating processes too carefully until they had more knowledge about the chemistry of ergot and the therapeutical value of the particular ingredients capable of being separated from it. He might also venture to remind the meeting how carefully the late Mr. Stoddart had at one time worked, not only on this subject, but on the ergots of grasses generally, and then he found that even such principles as he was able to detect generally in them varied according to the time at which they were gathered. Many other points of interest had still to be cleared up before they could attach too much value to any particular suggestion with regard to these preparations.

Professor Quinlan said it was a constant habit with medical men, particularly in obstetric practice, when using ergot to add to it a small quantity of ammonia. It was a well-known fact, which anyone could prove for himself, that ergot had the power of diminishing the tension in the capillary blood vessels, whilst ammonia had the contrary effect; therefore, a little quantity of ammonia was found to have a useful corrective effect in the exhibition of large doses of ergot.

Mr. Gerrard said it would be an answer to many inquirers if he stated at once that he did not claim for this preparation any activity beyond that of the liquid extract of the British Pharmacopœia. But the addition of ammonia appeared in some way to assist the activity or improve the action of the ergot. Those who used it gave it the preference, and every observation went to confirm this fact. Professor Quinlan had also corroborated that the addition of ammonia to a preparation of ergot, whether prepared first by simple aqueous extraction, or by ammoniacal extraction, did improve its action, probably by the fact that it was simply an adjunct and a stimulant. Mr. Stuart had referred to the use of acidulated water as a solvent for ergot preparations. He had no doubt that acidulated water was as good a solvent as water itself, or ammoniacal water, but it was a much slower solvent; by adding acid to water containing any albuminous principles, the passage of the water through the tissue was retarded. But the addition of alkali, on the contrary, caused a rapid penetration of those tissues, and that was just what took place here. It might be, too, that ammonia acted in some way to eliminate them and make them more soluble. It might be that it formed a combination with what had been called the active principle of ergot, sclerotic acid, although he did not himself look upon that as a definite substance. Mr. Martindale's process was similar to the one he had tried of using aromatic spirits of ammonia as a solvent, but practically he found that exceedingly difficult to work; he could not obtain a good process, there was considerable waste. The process of displacement was not practicable; there would take place a diffusion of the ammonia into the water used for displacement, and thus there was a loss, not only of ammonia but of the solvent and some of the ergot principles. There was this to be said, that if it could be carried out successfully in such a preparation there would be present not only the soluble extractive matter of the ergot, but also the ergot fats in the form of ammoniacal soap, and if those ergot fats did play any part in the action of the drug it would be an advantage, though according to the experiments mentioned by Mr. Schacht that appeared to be doubtful.

The next paper read was on—

Tumefaction as an Aid in the Identification of the Varieties of Maranta and other Starches.

BY W. H. SYMONS, F.R.M.S., F.C.S.

It has been shown by different investigators that Bermuda, Natal and St. Vincent arrowroots require for their tumefaction water of varying temperature.

Since these starches are probably identical in chemical composition, it follows that this behaviour must be due to some physical cause, most likely the greater or lesser density of the integuments. Seeing this, I was led to infer that any reagent which affects starch in the same way as hot water ought also to yield comparatively the same results.

Several reagents were accordingly tried. The caustic alkalies being found the most powerful and uniform in their action were chosen for further experiments. Solutions varying from 0·5 to 1·5 per cent. of chemically pure caustic soda were prepared, and 1 c.c. of each strength solution placed in a small vessel; to every vessel was added ·1 gram of the starch to be examined. The mixtures were well stirred at intervals for ten minutes, after which they were examined under the microscope.

The following precautions were observed. The starches compared were examined side by side. The alkaline solutions were of known strength, freshly prepared, exposed as little as possible to the air, and on no account allowed to evaporate when mixed with the starch. A constant proportion of starch and solution was used, it having been ascertained that if a small quantity of the solution burst any of the granules a larger quantity would burst all.

From these numerous precautions it may be thought that this process is much more tedious than merely placing starch in water of a known temperature; but in practice it is not so, quite as much care being necessary in the latter case as in the former, and a larger quantity of starch is required.

The results are tabulated to show the strength of the solutions, which respectively tumefied, 1st, a few granules; 2nd, the majority of the granules; and 3rd, all the granules. The numerals in the left-hand columns show the order which the starches would take, if arranged according to size. A table showing tumefaction by heat is also given.

Tumefaction by Caustic Soda.

Order of size.	Starch.	A few swollen.	Majority swollen.	All swollen.
2	Potato	·6	·7	·8
8	Oat	·6	·8	1·0
4	Natal	·7	·8	1·0
1	Tous-les-mois	·7	·9	1·0
5	Wheat	·7	·9	1·0
4	Bermuda	·8	9·	1·1
3	Sago	·8	·9	1·1
6	Maize	·8	1·0	1·1
7	Cassava	·8	1·0	1·1
4	St. Vincent	·9	1·0	1·2
9	Rice	1·0	1·1	1·3
		Per cent. solution.	Per cent. solution.	Percent. solution.

Tumefaction by Heat.

Order of size.	Starch.	A few swollen.	Majority swollen.	All swollen.
2	Potato	55° C.	60° C.	65° C.
7	Cassava	58° C.	63° C.	68° C.
4	Natal	58° C.	65° C.	70° C.
5	Wheat	60° C.	65° C.	70° C.
1	Tous-les-mois	65° C.	68° C.	72° C.
4	Bermuda	62° C.	69° C.	73° C.
3	Sago	64° C.	68° C.	74° C.
6	Maize	65° C.	70° C.	77° C.
8	Oat	65° C.	70° C.	77° C.
4	St. Vincent	66° C.	73° C.	77° C.
9	Rice	70° C.	75° C.	80° C.

With the exception of the oat and cassava starches, the starches in both lists will be seen to be arranged in nearly the same order. The oat starch under the microscope appears clean, but with the caustic soda it forms a yellow paste, indicative of gluten, which does not interfere with the action of the alkali, but does with that of hot water.

In a paper published in the first number of the present volume of the *Pharmaceutical Journal*, I pointed out the striking relation which exists between the temperatures under which the starch grew and its tumefying point. "The higher that temperature, the higher the point of tumefaction," but I said "cassava and oat starch are exceptions." However, using the alkaline method of tumefaction these starches are also seen to bear this relation. The reason why oat starch does this has been given above, but why cassava starch should behave differently to hot water and the alkali I do not know; it was tried repeatedly with both reagents and always with the same result.

Instances are on record of analysts having certified pure maranta and other starches as adulterated, where, subsequently, more competent microscopists have proved the starches assailed to be genuine, although not until the accused retailer had suffered considerable annoyance and been put to great expense to defend his case. This, I think, proves that, in some instances, it needs more time to practise the microscopical identification of the starches than the analyst is able to devote to that branch of his studies. Therefore any chemical test which comes to the aid of the microscope in such cases must prove useful. The tumefaction of starch by the above process needs no special practice, yet affords additional data, and hence may, I trust, fulfil the condition mentioned above.

The President, in proposing a vote of thanks to Mr. Symons, said he had put a new method into the hands of workers in pure science and applied science, and one by which they might confirm the results obtained by other methods. He was sure, for this last addition to his work on the starches, the Conference would accord him a vote of thanks.

Mr. Greenish could not allow this paper to pass without one or two observations. They were much indebted to Mr. Symons for giving them any assistance in determining the kind of starch they were examining, in addition to the microscope. Starch was almost universally diffused in nature, but in using the microscope for determining its presence, they found it very often where they did not expect to find it, and where really it had no business to be, whilst in other cases, when a particular kind of starch ought to be present, some other was detected. Starches being so widely distributed, any means by which they could be determined should be welcomed by pharmacists. Mr. Symons had confirmed some investigations of his own with regard to Bermuda, St. Vincent, and Natal arrowroot. Several years ago some maranta grown in Natal was pronounced by many public analysts to be potato starch, and it presented a considerable resemblance to it, but a good microscopist could determine the difference. There was, however, a great difference between maranta grown in Natal, and that in Bermuda or St. Vincent. The reason of this he could not explain, but such was the case. He was not sure that this method would be of very much service without the microscope, on which he should prefer to rely, and in the examination of starch he thought it was desirable to use one particular power, and adhere to that power for all starches. The relative sizes of the starch grains were of great importance, and these could best be determined by an educated eye, using one particular power. He also found that if the medium in which the starch is examined be coloured, it assisted the observer, and in addition to the microscope, the polarizer might be used to advantage.

Mr. Symons said he did not put forward this method as superseding the microscope, but by this means it was quite possible to distinguish between Natal arrowroot and potato starch. If Natal arrowroot were mixed with ten times its weight of ·8 solution of caustic soda, it would only be partially tumefied; if it were potato starch, it would tumefy completely. It took a 1 per cent. solution to tumefy Natal arrowroot to the same extent.

(*To be continued.*)

Review.

THE PHARMACOPŒIA OF THE LONDON HOSPITAL. Compiled under the Directions of a Committee appointed by the London Hospital Medical Council. London: J. and A. Churchill. 1882.

From the preface of a volume bearing the above title recently put into our hands by Messrs. Churchill and Co., we learn that the previous edition of the Pharmacopœia of the London Hospital has become exhausted, and that the present work is intended not only to keep abreast of the times, but also to form a useful guide to students in the art of prescribing.

The objects of a pharmacopœia are, first, to define the materia medica, and, secondly, to give formulæ for the various preparations from that materia medica. In this book the first of these objects has scarcely been fulfilled, for with the exception of certain chemicals from the British Pharmacopœia, to which "B.P." is attached, as a general rule no definition whatever is given of the various drugs. Rhubarb is described as rhei rad. simply—any rhubarb, English or foreign, may be used. For pepsine no mode of preparation is given, even the animal from which it is to be procured is not identified. Ergotine is mentioned, but it is particularized no further, although the mode of preparation has a great influence upon the strength of the product. We are glad to see that many new and recently introduced preparations of undoubted merit, such as sclerotic and hydrobromic acids, curare, gelsemium, thymol, homatropine, chrysophanic acid, pancreatin, etc., are included; but we miss an old and well-tried friend like cinchona calisaya, which is conspicuous by its absence, and even a liquid of such general utility as aq. dest. finds no place here. Although a form for ext. quebracho liq. is given, quebracho does not appear in the materia medica.

The formulæ are, however, as important, perhaps more important, than crude drugs, and here there is much to praise and a good deal to condemn. Hydrobromic acid is made by Fothergill's process, not the best either for purity of product or economy of preparation. The strength would be better stated in HBr rather than in Br. The formula for hypodermic injections, iodized cotton, extract of malt, etc., are good and well devised. The syrups are more properly glyceroles, and we can find no mode of preparing the "freshly precipitated" hypophosphites therein required.

The propriety of making all emulsions with tincture of quillaia is open to question, as is also the process for making ammoniated extract of ergot. The latter is anything but economical. The detection too of oil of theobroma with olive oil in a suppository basis is unnecessary.

The formulæ for children call for no special remark. The appendix contains directions for estimating urea and sugar in urine, for making staining solution, and a very complete list of poisons with their antidotes. The Latin abbreviations, the list of which includes many antiquated and obsolete forms, might have been left to 'Selecta e Prescriptis.' The work is completed by a list of metric weights and equivalents and a table of doses.

Although making a distinct advance on previous pharmacopœias, we cannot but wish that more care had been bestowed on the materia medica, and that the formulæ had been more fully revised. In a future edition we hope that this will be carried out.

Notes and Queries.

[733]. COLOURED CARBOYS.—In reply to J. R. Hill, I have been informed that coloured carboys were first introduced by the old alchemists, as a symbol that they were employed in the transmutation of the baser metals into gold.

The hieroglyphics were the same as those employed by the ancient astrologers to represent the planets. For instance:—

Gold (Sol) was represented by a circle ⊙, indicating perfection and density.

Silver (Luna) by a semicircle ☾, because thought to be half gold.

Mercury represented by ☿, thought to consist of gold, silver and acrimony.

Copper, ♀, gold with acridity.

Iron, ♂, gold with acridity, dedicated to Mars the god of war.

Tin (Jupiter) ♃, half silver, half acridity.

Lead (Saturn) ♄, considered the oldest metal known, capable of destroying all others, resembling the father of the gods, Saturn, said to have devoured his own children.

FREDERICK DAVIS.

[737]. EXT. CINCHONÆ LIQUIDUM.—In reply to "737," the "divergent results" obtained by your correspondent with different samples of the above doubtless arise from each manufacturer using different samples of bark. The supply of yellow bark described in the B.P. as that of *Cinchona Calisaya* (Weddell), collected in Bolivia and Southern Peru, has certainly not met the demand for years, and therefore, in the absence of any official B.P. addenda, manufacturers may fairly lay claim to use their own judgment in making ext. cinchonæ liq., B.P., from bark of any hybrid or variety of *Cinchona Calisaya* which may happen to contain 2 per cent. of quinia. Some varieties of Indian bark contain more than the above percentage and yield at the same time more extractive matter to percolation. By using equal parts of Bolivian and Indian bark a very good sample of ext. cinchon. liq. may be produced, having a slightly higher specific gravity than that described in the B.P. At present dispensers are to a great extent in the hands of manufacturers for a supply of good liquid extract, but there are respectable wholesale drug houses who can be relied on to supply it.

SPECIFIC GRAVITY.

[738]. LINIMENTUM AMMONIÆ.—It is well known that the linimentum ammoniæ, B.P., becomes thick and lumpy after being kept for a short time. It may be of interest to your readers to know that this may be prevented by the addition of a small quantity (about 1 drachm to ℥iv) of spirits of wine.

A. H. DOBSON.

Correspondence.

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

AUTOGRAPH PRESCRIPTIONS FOR IRELAND.

Sir,—The Council of the Pharmaceutical Society of Ireland having recently passed a resolution, proposed by me, authorizing a collection of autograph prescriptions to be formed for the use of the examiner in pharmacy, I am desirous to have the collection, as varied as possible, placed in books similar to those in use at the Bloomsbury Square examinations.

With this view, if any of your readers should be willing to contribute towards the above object, by sending original prescriptions to the undersigned, the favour will be alike esteemed and gratefully acknowledged by

48, *Henry Street, Dublin.* WILLIAM N. ALLEN.

LEECHES.

Sir,—A reference to pages 8 and 64 of the General Index to the Journal will show your correspondents that the subject of the "keeping of leeches" has received a fair share of attention. As, however, the Journals may

not be at hand I may repeat the result of my experience, which has now extended over several years.

The best form of aquarium, at any rate the most economical, is the ordinary inverted bell or propagating glass, on a stand and with any suitable covering. At the bottom there should be a layer of mud 3 or 4 inches deep, procured from the bottom of a clear pond or ditch. Over this should be some well washed gravel. By far the most satisfactory plant to grow is the *Vallisneria spiralis*, as, if well rooted and not exposed to too much light, it thrives well, propagates, and keeps the water perpetually sweet. Otherwise the ordinary weeds from any pond will answer the purpose, only as they will not stand the "*forcing*" incidental to their changed circumstances they will require to be occasionally renewed.

Adopting this plan, we have kept from 20 to 30 leeches at a time, with rarely any loss. The water at present in the aquarium has not been changed for eighteen months, and before that it was not changed for six years, a quart or so only being now and again added to replace loss by evaporation.

The green on the side of the glass is a low form (conferva) of vegetable growth, which, though sometimes unsightly, aids in preserving the water. It may be prevented by putting the aquarium in a more shaded place. It should be remembered that submerged water plants do not require much light.

To those who care to see it, there is in a pond in a brickfield off Platt's Lane, Hampstead, the most luxuriant growth of *Anacharis* I have ever seen, The bottom is covered with plants from 12 to 18 inches high.

Has Mr. Hart any water snails in his aquarium? If so, the ova deposited on the side are more likely to be those of *Planorbis* or *Limnea*.

Slack's 'Marvels of Pond Life' is a book that will greatly aid the study of the microscopic forms of aquatic life, both animal and vegetable.

33, *Norfolk Terrace, W.* A. P. BAKER.

Sir,—In reply to "Aquam" I beg to state that the water in my aquarium was changed on June 30 last, and is now perfectly clear and free from smell, the evaporation of water having been reduced to a little over ½ inch from usual height in aquarium. The vegetation is very trifling, and I might state scarcely perceptible, neither have I noticed it much at any time.

Devonport. J. A. LAMBLE.

THE "NEW" STYPTIC.

Sir,—The paper read at the meeting of the British Pharmaceutical Conference, relating to the virtues of the plaintain, will undoubtedly be interesting to a great many. Why, however, it should be termed a "new" styptic I am rather at a loss to understand. Individually I have used it for many years as a hæmostatic in alveolar hæmorrhage, and consider it analogous to arnica and hamamelis in its action, though perhaps no better, if as good as the latter. In cases of odontalgia there is perhaps no better remedy. Applied after the Swiss method, *i.e.*, by tearing the fibres from the leaves and inserting into the ear of side aching, in cases benefited the fibres become black; if no relief is obtained they remain green. The ratio of cure is about seven-tenths of the whole number of cases. Its therapeutical value in erysipelatous inflammations, dysenteric discharges, lacerated and incised wounds, sphacelus, and as an antidote for ivy poisoning, it is decidedly of the first order. In point of fact it is one of the good old remedies, despised perhaps on account of its simplicity and discarded. The "new" sedative "pulsatilla" will likewise prove of much therapeutic value when more generally exhibited. It is very amusing to hear of these so-called "new remedies," lately discovered, and when we attempt to find out their "pedigree" to discover that Pliny, Hippocrates, and even Hahnemann prescribed them.

Exeter. JOSEPH ABBOTT.

MR. CYRUS BUOTT.

"The world is wide, these things are small,
They may be nothing, but they are all."

Sir,—Will you permit me to acknowledge the donations I have received since January last in aid of poor old Mr. Buott? It is with sincere regret I have to state that the fund is quite exhausted. I have not, however, withheld the weekly sum which for some time I have been enabled to give Mr. Buott and his daughter, who so devotedly attends on him, for I have hoped that I might continue to receive adequate additions to the fund.

In one sense I most reluctantly repeat my appeal, yet I am persuaded there are many who knew Mr. Buott when he was not an unimportant factor in pharmaceutical politics, who will not allow him to end his days in a state of unrelieved poverty. With this assurance I again make known his wants, and plead on his behalf. He is very old and feeble, but the care and kindness we may give will help to bring rays of brightness and comfort into his sick chamber.

205, *St. John Street Road, E.C.* ROBERT HAMPSON.

	£	s.	d.
Alfred Bishop, London	2	2	0
Alfred Frank, Ramsgate	0	5	0
Thomas Randall, Wareham	1	10	0
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Robert J. Elliott, Liverpool	1	1	0
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A few Chemists' Assistants at 225, Oxford Street, W.	1	10	0
James Woodcock, Birkenhead	1	1	0
"Anonymous," Sheffield	0	15	0
J. R. Wooster, Turnham Green	2	0	0
C. B. Miller, Blackheath	0	12	6
Thomas Pullan, Bradford	0	10	0
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G. N. T., Ventnor	1	0	0
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William Blain, Bolton	0	13	0
Benjamin Whitrow, Tunbridge Wells	1	0	0
Robert Hampson, London	1	6	0

W. Johnston.—(1) Lavtera. (2) *Symphytum asperrimum.* (3) *Polygonum aviculare.*

W. Miller.—(1) *Hypericum androsæmum.* (3) *Malva moschata.* (6) *Cotyledon Umbilicus.* Nos. 2, 4 and 5 are named correctly. The subscription becomes payable on the 1st of January in each year.

M. P. S.—Such carelessness is no doubt very blameable, but there does not appear to have been any evidence that the fault lay with a chemist and druggist. The acid might have been put into the bottle by your customer.

Lubberly Lout.—Such behaviour is unusual with tinct. opii; the sample of opium must have been exceptional.

Wopper.—Reduce the extract on a warm slab to about one-half its weight; then make up the weight, or perhaps a little more, with pulv. glycyrrhizæ.

C. S.—The ointment when freshly prepared is without colour; but it changes if kept, or if made with rancid lard. It is possible that in the first instance the ointment may have been prepared with benzoated lard which by keeping had acquired rancidity.

T. P. B.—*Phallus impudicus.*

Minor.—It is illegal for a person who is not registered as a pharmaceutical chemist to assume the title of "pharmacist," or to exhibit any name, title or sign implying that he is so registered.

Jacque.—The two terms are synonymous.

Ferri.—Such a practice would be illegal.

Antiseptic.—The "boroglyceride" is prepared by heating boracic acid and glycerine together at a high temperature (see vol. xii., 883 and 992). Full details will be found in the specification of the patent, No. 1332, 25th March, 1881.

Ariovistus.—The initials imply fellowship of the Institute of Chemistry, the Secretary to which is Mr. C. E. Groves, Somerset House Terrace, W.C.

F. A. B.—Apply for information to the Secretaries of the respective Societies.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Woodland, Shenstone, Long, Thresh, Jackson, Marks, Tichborne, Viking, Chemicus, H., W. H. B.

TONGA—IMPORTANT NOTICE

REDUCTION IN PRICE.

ALLEN & HANBURYS are glad to state that they have been able to make arrangements for an important reduction in the price of TONGA.

On and after November the 1st the present 4/6 size will be reduced in price to 2/9, and larger sizes will be put up at 4/6 and 11/-. None of the new sizes will be issued until November 1st. During November all stocks of the old sizes on hand can be returned through the house from which they were bought, and will be credited or exchanged for an equivalent value in the new sizes.

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,, ,, (Rose) .....2/6 ,,
} The Two can be had mixed.

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Various, assorted or mixed.

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A bronchial and pulmonic Jujube of delicious flavour.

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Prepared as originally suggested by Dr. PROSSER JAMES.

Lecturer on Materia Medica and Therapeutics, London Hospital; Physician to the Hospital for Diseases of the Throat, &c.

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3.—**Morphia and Ipecacuanha.** ($\frac{1}{40}$ grain Morph., and $\frac{1}{4}$ grain Ipecac.)

4.—**Compound Morphia and Ipecacuanha.** A more active remedy than No. 3. ($\frac{1}{40}$ grain Morph., $\frac{1}{5}$ Ipecac., $\frac{1}{5}$ Squill, &c.)

5.—**Opium and Belladonna.** An agreeable substitute for the Torch: Opii B. P., and of the same strength.

6.—**Aconite.** Each Pastille equivalent to half a drop of the B. P. Tincture.

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10.—**Benzoated Voice.** Useful to public speakers, &c. Less active than the Compound Camphor, No. 7.

11.—**Chlorate of Potash.** A more agreeable form than the lozenge of the Pharmacopœia.

12.—**Chalybeate.** (Pastilli Ferri., A. & H., 1 grain Citrate of Iron.) An agreeable form of lozenge, readily taken by children.

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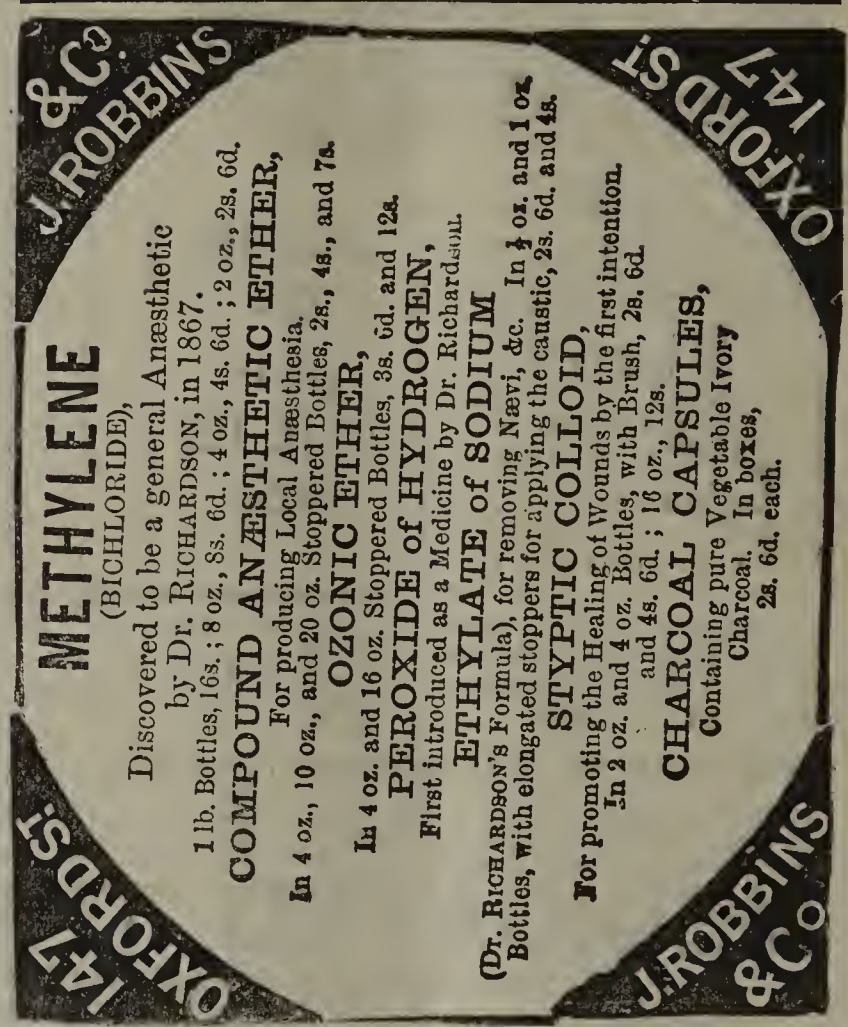

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BENGER'S PEPTONISED BEEF JELLY—May be taken by teaspoonfuls as a quick restorative, or used to fortify ordinary beef-tea, soups, &c. Tins, 2s. each.

BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

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St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

St. Mary's Hospital Medical School,
PADDINGTON, W.

The Introductory Lecture, by Dr. Chambers, MONDAY, OCTOBER 2nd, 1882, at 3.30 p.m.

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Consulting Officers—Dr. Chambers, Sir James Alderson, M.D., F.R.S., Mr. Lane, Mr. Spencer Smith, Mr. J. R. Lane, Mr. White Cooper.
Physicians—Dr. Handfield Jones, F.R.S., Dr. Sieveking, Dr. Broadbent.
Physicians in Charge of Out-Patients—Dr. Cheadle, Dr. Shepherd, Dr. Lees.
Surgeons—Mr. Haynes Walton, Mr. Norton, Mr. Owen.
Surgeons in Charge of Out-Patients—Mr. Page, Mr. Pye, Mr. A. J. Pepper.
Physician-Accoucheur—Dr. Alfred Meadows.
Physician-Accoucheur in Charge of Out-Patients—Dr. Wiltshire.
Ophthalmic Surgeon—Mr. Anderson Critchett.
Aural Surgeon—Mr. Field.
Surgeon-Dentist—Mr. Hayward.
Medical Tutor—Mr. Pepper.
Other Lecturers—Dr. Wright, F.R.S., Dr. Randall, Mr. Mivart, F.R.S., Rev. J. M. Crombie, Mr. Malcolm Morris.

The course of teaching at this School ensures careful and complete preparation for all the Examining Boards, the Public Services, and the higher University Examinations. Special instruction is given to Students preparing for the Examinations of the University of London.

The MEDICAL TUTOR assists the Students in their Clinical Work and in preparing for the Final Examinations, so that the training of every individual Student is supervised. Ophthalmic, Aural, and Dental Surgery, Comparative Anatomy, Histology, and Pathology, are carefully and systematically taught both by Lectures and Practical Demonstrations. There are also departments for the Diseases of Women and Children, of the Eye and Ear, of the Skin, and of the Throat.

SCHOLARSHIPS.

Two Scholarships of the value of £150 and £100

These Scholarships are awarded every year by open competition in Natural Science previous to entrance at the School.

A Scholarship of £20 in Anatomy.

A Scholarship of £40 in Pathology, carrying with it the appointment of Assistant-Curator.

These are awarded annually.

PRIZES.

Prizes are given in each class at the close of every Session.

APPOINTMENTS.

Four House-Surgeoncies, each tenable for one year.
A Resident Obstetric Assistantship, tenable for six months.
These Resident Medical Appointments are open to the Pupils without expense of any kind, and are equivalent to Four Scholarships of the annual value of £50.

For the Prospectus apply to

A. B. SHEPHERD, M.D., Dean of the School.

Western Medical School, Glasgow.
WINTER SESSION, 1882—83.

The WINTER SESSION will be opened on WEDNESDAY, 1st NOVEMBER, at 3 p.m., with an Introductory Address by Dr. McVail.

Anatomy, Descriptive, 11 a.m. } A. Ernest Maylard, M.B., B.S. Lond.
,, Demonstrations, 2 p.m. } A. Ernest Maylard, M.B., B.S. Lond.
Practical Anatomy, 9 a.m. till 4 p.m. } A. Ernest Maylard, M.B., B.S. Lond.
Chemistry, 10 a.m.—J. M Milne, Ph D.
Physiology and Histology, 1 p.m. } W. Limont, M.A., M.B.
Practical Physiology, 3 p.m. } W. Limont, M.A., M.B.
Surgery, 12 noon—D. N. Knox, M.A., M.B.
Medicine, 11 a.m.—D. C. McVail, M.B.
Materia Medica and Therapeutics, 3 p.m.—Neil Carmichael, M.D.
Midwifery and Gynecology, 12 noon—W. L. Reid, M.D.
Medical Jurisprudence, 4 p.m.—Eben. Duncan, M D.

SUMMER SESSION.

Anatomy, 11 a.m. } A. Ernest Maylard, M.B., B.S. Lond.
Practical Anatomy, 8 a.m. till 4 p.m. } A. Ernest Maylard, M.B., B.S. Lond.
Practical Chemistry, 10 a.m.—J. M. Milne, Ph.D.
Practical Physiology, 3 p.m.—W. Limont, M.A., M.B.
Operative Surgery, 1 p.m.—D. N. Knox, M.A., M.B.
Midwifery, 12 noon—W. L. Reid, M.D.
Practical Pharmacy, 11 a m.—Neil Carmichael, M.D.
Public Health, 2 p.m.—Eben. Duncan, M.D.

Students attending this School obtain their Hospital Practice and Clinical Lectures at the Western Infirmary:—

Physicians—Drs. Gairdner, McCall, Anderson, Finlayson, Tennent.
Surgeons—Drs. Macleod, Buchanan, Patterson, Cameron.
Dispensary Physicians—Drs. Coats, McVail, Gemmell.
Dispensary Surgeons—Drs. Lyon, Knox, Christie.

The Lectures of this School qualify for the Examinations of the University of Glasgow in accordance with the University regulations; the Faculty of Physicians and Surgeons, Glasgow; the Royal Colleges of Physicians and Surgeons, Edinburgh, London, and Dublin.

CLASS FEES.—For each of the above Courses of Lectures (except Anatomy), First Session, £2 2s.; Second Session, £1 1s. Students who have attended a similar Course elsewhere will be admitted at the reduced fee of £1 1s. Fee for Anatomy, including Practical Anatomy, £4 4s.

The fees for all the Lectures and Hospital Practice required for the Diplomas of Physician and Surgeon amount to £50.

Further information and Prospectuses may be obtained on application to Dr. Knox, 23, Elmbank Crescent, Glasgow.

TO PHARMACEUTICAL STUDENTS.

THE next competition for the Pattison Pharmaceutical Scholarship will be held on Friday, 29th September next. The holder is entitled to FREE EDUCATION in all the branches for the Minor Education. For all particulars apply to SECRETARY, Edinburgh School of Pharmacy, Marshall St., Nicolson Sq., Edinburgh.

WILLS' UNIVERSAL POSTAL SYSTEM.

NOTICE TO PRELIMINARY STUDENTS.

We are astonished to find that so many failures still occur in the Preliminary Examination of the Pharmaceutical Society, after the enormous expenditure which has been incurred in producing such a thorough course of teaching as the Universal Postal System. In July last, 370 Candidates presented themselves, of whom 181 failed. Had these rejected candidates been through a course of instruction under this system, the probability is that two-thirds of them would have passed.

As we never publish the List of Candidates who pass by this means, Students are unable to judge of its usefulness, we can therefore only refer them to numerous successful Students, and to the press, of which the following is an extract:—

THE MAGAZINE OF CHEMISTRY AND PHARMACY.—"Probably the young man who is an assistant, or apprentice, some hundreds of miles from London, will declare with a regretful sigh that he cannot afford the time or the money to come to London and study, and that he has no means beyond his own personal efforts therefore to rely on. We should cordially sympathise with this person, because we feel sure he would never be successful, did we not know that he has an all-sovereign balm for his woes at hand, obtainable for the expenditure of a mere trifle, and therefore leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness. Mr. WILLS, of Westminster College, one of our most thoroughly successful 'tutors,' extends him a helping hand. We cordially advise a trial of Mr. WILLS' principle, and we have every confidence the essayist will not be disappointed.

FEE, 10s. 6d.

BEWARE OF IMITATIONS.

For Syllabus and testimonials, apply (enclosing stamp) to Messrs. WILLS & WOOTTON, Westminster College, Trinity Square, London, S.E.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(*From the Royal School of Mines*),

130, CAMDEN ROAD, N.W.

STUDENTS REASSEMBLE ON SEPTEMBER 4th.

A larger percentage of students pass the Pharmaceutical examinations from my school than from any other.

Special teaching (private or postal) for OCTOBER and DECEMBER candidates. Enclose stamp for particulars.

Laboratory close to Gower Street Station.

JUDD'S

AIDS TO EXAMINATION.

PRELIMINARY.—"A Lithographed Course of Preliminary Lessons and Exercises." Fully worked out in English, Latin, Arithmetic, Metric System, and Essays. It has been pronounced by Students as the most serviceable course of work for the Preliminary Examination, affording an unerring guide to success. Price, post free, 6/8.

MINOR.—BOTANY, Notes on Structural, 1/0½. THE ATOMIC WEIGHTS AND QUANTIVALENCE, in rhyme, 6½d. A SHORT CUT TO THE OINTMENTS, in rhyme, 1/0½. PHARMACY: a new lithograph, 40 pages, 1/6½. MATERIA MEDICA, 2/7, contains the essential. PHYSICS, 1/0½, contains typical examination problems, &c., &c., upon density, gravity, pressure, temperature. ANALYSIS, 1/6½, supplies the Minor Course of practical work.

Others and new editions of Lithographs and Memory Works, which are out of print, are in preparation, and will be advertised as soon as published.

Post Office orders payable at Southampton Row, W.C.

Letters to

Mr. H. JUDD, Private Tutor,

44, ARGYLE SQUARE, KING'S CROSS, W.C.

THE MASON SCIENCE COLLEGE,

BIRMINGHAM.

SESSION—1882-83.

DEPARTMENT OF SCIENCE AND ARTS.

The SESSION will commence on Tuesday, the 3rd of October, 1882.

Students under sixteen years of age are required to pass a Preliminary examination.

All Departments of the College are open to both sexes on the same terms.

The Calendar, containing full information as to the Classes, Fees, &c., is published by Cornish Brothers, New Street, Birmingham, price 2s.; by post, 2s. 4d.

GEO. H. MORLEY, *Secretary.*

The London Hospital and Medical College, Mile End, E.—The SESSION 1882-83 will commence on Monday, October 2, 1882. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other Hospital appointments are free. The resident appointments consist of Five House-Physicianeies, Five House-Surgeoneies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis.

MUNRO SCOTT, Warden.

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The next **complete** Course of Lectures will commence on Monday, Jan. 1st, 1883, but a **short one**, embracing all the principal facts, will be held from Monday, Oct. 30th, to the December Examinations. The fee for this short course is **4 guineas**, and it is especially recommended to candidates who have already undergone a course of study and wish to complete their education under a system that will the best ensure their success. Candidates are requested to bear this fact especially in mind, viz., that most of the Students of this School pass the **first time** of their presentation. For Prospectus, apply to

Messrs. LUFF & WOODLAND.

THE EDINBURGH SCHOOL

OF

PHARMACY & CHEMISTRY

Marshall Street, Nicolson Square.

ESTABLISHED IN 1878.

THE next Session commences on Monday, 2nd October, 1882.

The Lecture Rooms and Laboratories of this School have been removed to much larger premises, and offer increased facilities for Pharmaceutical Students becoming practically acquainted with their subjects. The Student's progress is tested from time to time by oral and practical examinations, and the Botanical Gardens are visited, the teacher giving demonstrations on the plants. Great additions have been made to the Museums, where Students can read with the various specimens. Medals and honours certificates are awarded by competitive examinations at the close of each session.

Hitherto one Session of three months has been found to be sufficient where the candidate possessed previous knowledge in his subjects, but a Second Course can be taken at a reduced fee.

For particulars, apply to

R. URQUHART, Secretary.

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

The Eleventh Session commenced on Friday, September 1st.

No more Students can be received in the Major Laboratory.

FEES.

Until the October Examination...	£4 4s.
Until the December ,, ...	£8 8s.
Until Qualified (Minor)	£10 10s.
Until Qualified (Minor and Major)	£15 15s.

The next Course will commence on Friday, October 27th.

Students are strongly advised to enter at the commencement of a Course of Lectures. Entries are now being received for October. Gentlemen desirous of attending the next Course of Lectures, should send in their names as early as possible, as there will be only a few vacancies.

EVENING CLASSES.

The above Classes re-assembled on Tuesday, September 5th, and will be continued through the Session.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

STUDENTS AT THE SQUARE,

ON the look out for Partial Board and Lodging, with the comforts and advantages of home, should write for particulars to V. B., 96, Gillespie Rd., N. Half-an-hour's journey from Bloomsbury Sq. Assistance given in evening studies. Terms moderate.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, will commence on the 15th September. No time should be lost in securing benches, either in the Major or Minor Laboratories.

For Syllabus, &c., apply to W. BAXTER, Secretary.

TERMS FOR ADVERTISEMENTS

IN THE

PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION

7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, as also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6d. Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **P. O. Order**, payable at Regent Street, W., to J. & A. CHURCHILL.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

J. & A. CHURCHILL, 11, New Burlington St., London, W.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

THE MANCHESTER COLLEGE OF PHARMACY,

225, OXFORD STREET, MANCHESTER.

Mr. W. S. TURNER refers for proof of what he *can* do in preparing Students for the Examinations of the Pharmaceutical Society to the success which *has* hitherto attended his mode of instruction. **Fee, £3 3s. per month.**

ENGAGEMENTS WANTED.

ASSISTANT. In good Family business, with view to succession. MINOR, 17 & 18, Lune St., Preston, Lancashire.

AS out-door ASSISTANT or MANAGER, by a married man No family. Speaks French. Permanency desired. ASSISTANT, 14A, Brewer St., Golden Sq.

ENGAGEMENTS WANTED.

AS ASSISTANT. Out-door preferred. Married. In good-class Dispensing business. Age 29. Can Prescribe and Extract Teeth. Good references. 10 years' experience. Englishman. T. H. D., 66, Rathmore Ter., Cork.

AS LOCUM TENENS.—A gentleman, of long experience in first-class Retail (Ph. Chemist), seeks an engagement for a short or long period. ALPHA, Hamilton Villa, Charlton, Cheltenham.

PARTIAL Employment.—As Dispenser to Surgeon or Chemist for 2 or 3 hours during day or evening. Age 21. 6 years' experience. CLIFFTON, 12, Dunford Rd., Holloway, N.

AS ASSISTANT. Temporary or permanent. In London. Town and country experience. Age 23. Good references. CHEMICUS, 2, Maclise Rd., West Kensington Park, W.

AS ASSISTANT (out-door) in London. Camden Town preferred. Age 21½. Height 6ft. Passed Preliminary. 4½ years' experience. Good references. J. B. N., 75, High St., Stourbridge.

IN the Wholesale.—By a young man, 21 years of age. 4 years' experience. Good references. STATIM, 12, Westbourne St., Sloane Sq., S.W.

ADVERTISER, age 25, who has passed Preliminary, would give 3 years' service to learn Chemists' trade. H. B., 9, Crystal Ter., Clifton Rd., South Norwood, Surrey.

LONDON or Suburbs.—As ASSISTANT, with time for study or otherwise. Age 22½. 8 years' experience. J. E. JONES, care of Mr. Neil, Kent House, Kent Rd., Shirley, Southampton.

LONDON or Manchester.—As ASSISTANT or DISPENSER, with time for study in evenings or during the day. Age 22. Height 5ft. 9in. Good Dispenser and Counterman. First-class testimonials. 6 years' experience. Disengaged. FELIX, Mr. Longstaff, 5, Saville St., Portland Pl., London, W.

AS ASSISTANT or JUNIOR. Age 21. Height 5ft. 11in. 6 years' experience, West-end and country. CHEMICUS, 26, Westgate St., Ipswich.

AS ASSISTANT. 6 years' experience. Age 22. Height 5ft. 10in. Accustomed to good Dispensing and first-class Retail. Minor and Hall qualifications. Good references. B., Mr. Dore, Pharm. Chemist, New St., Huddersfield.

AS ASSISTANT in a good Dispensing business. London preferred. Good references. Age 24. Height 5ft. 9in. W., 100, Phillip St., Bedminster, Bristol.

AS ASSISTANT, to Manage or otherwise. With good general town experience. Age 26. Good Prescriber. Excellent references. CHEMICUS, 401, Coldharbour Lane, Brixton, S.W.

FRANCE or Italy.—As ASSISTANT (English), in first class house, about middle of October. Age 24. Fully qualified. Good references. Excellent experience. T. K., 1, Harold Pl., Hastings.

AS ASSISTANT or DISPENSER. Out-door. Age 23. Married. 6½ years' experience. Good references. CHEMICUS, 12, Gleave St., Everton Rd., Liverpool.

AS JUNIOR. In London. Age 20. Height 5ft. 9in. 5 years' experience in Mixed trade. Good reference. Passed Preliminary. W. D. C., 44, Argyle Sq., W.C.

A PERMANENCY in good London business. At liberty beginning of October. Age 32. Passed Major. Salary moderate. ASSISTANT, 51, White Ladies Rd., Clifton.

A PERMANENCY, by a Junior. More than 1 kept. London preferred. 15 months' town experience. Satisfactory references. T., 27, New St., Dorset Sq., N.

ENGAGEMENTS WANTED.

AS ASSISTANT. Major and Hall qualifications. Good experience. Age 22. R. C., care of Union Bank of London, Holborn Circus, E.C.

AS JUNIOR. Age 19. Height 5ft. 8½in. 3¾ years' experience in Dispensing and Retail. Good reference. ALPHA, Mr. Noble, Barmby, Howden, Yorks.

AS ASSISTANT. Where 2 or more are kept. Age 24. 8½ years' experience. Minor qualification. W., 13, Hereford Rd., Bayswater, W.

AS ASSISTANT in light Retail. Age 26. 7 years' experience in Dispensing, Prescribing, and Counter Practice. Good reference. Salary moderate. Surgeon preferred. ALPHA, 2, Station Rd., Wood Green.

AS JUNIOR. Just out of time. 4 years' experience. Country business preferred. H. S., 93, King's Rd., Reading.

AS Junior ASSISTANT. In London or suburbs. Age 21. Good references. BETA, 12, Westbourne St., Sloane Sq., S.W.

AS JUNIOR in a Dispensing business. Age 21. 6 years' experience. Height 5ft. 9in. Excellent reference. WM. SHEPARD, Quay St., Newport, I. of W.

LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. 30 years' town and country experience, and unexceptionable references extending over the last 12 years.

TO Medical Men or Chemists.—Advertiser, 25, wishes for EMPLOYMENT for 1 or 2 hours daily. Near Bloomsbury Square preferred. M. W., 200, Lancaster Rd., Notting Hill, London.

TEMPORARY ASSISTANT, by the day or week. Age 33. Good references. Total abstainer. Disengaged after the 23rd. CHEMICUS, 340, York Rd., Camden Rd., N.W.

AS DISPENSER. 7 years' experience. Age 21. Height 5ft. 8in. Highest references. Can Extract Teeth, Prescribe, &c. J. W. KNOWLES, Mr. Turner's, St. Ives, Hunts.

DISPENSER and BOOKKEEPER to Surgeon. Out-door. 5 years' reference. Accustomed to General Surgery work and Teeth Extracting. DISPENSER, 1, Selwyn Rd., Antill Rd., Mile End, E.

AS MANAGER, temporary or otherwise. First-class references. Kingston till 18th. J. H., Holly House, Upper Clapton, E.

AS MANAGER in a good Dispensing and Retail business. Thorough practical experience in good class business. Registered. Good references. N. W. F., 47, Tollington Rd., Holloway, N.

AS MANAGER or ASSISTANT. Good pushing Counterman, Dispenser and Prescriber, Extracts Teeth, &c. Permanency. Minor. Age 25. Highest references. 11 years' experience. MINOR, 29, Cobden St., Liverpool.

MANAGER or otherwise. Accustomed to good class of business. Total abstainer. Age 30 years. Good references. ALPHA, 1, Garibaldian Villas, Somerset Rd., Tottenham, Middlesex.

AS TEMPORARY or otherwise. 10 years' first-class Dispensing and Retail experience. Highest references. Height 5ft. 9in. Age 25 years. PHARMAKON, 36, Oxford St., Liverpool.

AS ASSISTANT. In or out-door. First-class references and experience. Permanency. In London preferred. Age 26. Height 5ft. 10in. ROBERTS, 37A, Tavistock Rd., Westbourne Park, W.

AS ASSISTANT to Chemist, Surgeon, or Dispenser to Public Institution. References and testimonials unexceptionable. S. G., Stafford Villa, Hartington Rd., South Lambeth, London, S.W.

ENGAGEMENTS WANTED.

IN good Dispensing business. Manchester or district preferred. Age 19½. Height 5ft. 10½in. 5 years in good class Retail. ALBERT SMITH, High St., Loftus-in-Cleveland, Yorks.

AS ASSISTANT. Age 23. 6 years' experience. Good reference. With particulars, C. F., 24, Bouverie Rd., Folkestone.

ASSISTANTS WANTED.

MESSRS. WAITE & KITE, Cheltenham, will require shortly, a thoroughly competent ASSISTANT as Dispenser. Applications, with full particulars as to experience, age, height, and salary required, if not answered in 3 days may be considered declined.

OUT-DOOR ASSISTANT by Sept. 25th. Qualified, with some London experience, and competent to take charge in absence of principal. Only one kept. No Sunday duty. Apply, stating salary required, &c., to D. M. I., 10, St. Maur Rd., Fulham, S.W.

QUALIFIED ASSISTANT. Out-door. Under 30 years of age. Short hours. No Sunday duty. Apply personally, or enclose photograph, C. BEDFORD, 6, St. Swithin's Lane, E.C.

A THOROUGHLY qualified ASSISTANT, not under 25, accustomed to first-class business. State age, height, and salary required, with carte, if convenient, to OMEGA, care of Messrs. Barron & Harveys, Giltspur St.

E. PALMER, Chemist, Aylesbury, requires a GENTLEMAN who is used to take temporary charge, and can be well recommended, for a week or 10 days, from October 7th. One who could give similar time at Christmas preferred.

A COMPETENT in-door ASSISTANT. About 23 or 24. Apply, giving references, age, salary, and height, to CHARLES JONES, Pharmaceutical Chemist, Birkenhead.

ASSISTANT. Qualified. Conversant with better-class of market town business, with Dispensing. Obliging, and good Counterman. Equal to occasional Management. Sunday duty nominal. Salary £60. Apply, with full details of experience, to X., care of Messrs. Barron, Harveys & Co., Giltspur St., London.

AN ASSISTANT, by the 1st of October. In-door. About 26 years of age. Applicants to enclose carte de visite, with full particulars. ARMBRECHT, NELSON & Co., 23, Duke St., Grosvenor Sq.

MR. IVE has a vacancy for a competent JUNIOR, with Minor qualification, accustomed to good class Retail and Dispensing. Apply personally at 115, Gloucester Rd., South Kensington.

A THOROUGHLY competent ASSISTANT required, with qualification preferred, in a first-class West-end Dispensing and Retail business. Apply to CHEMIST, 45, Buckingham Palace Rd., S.W.

FOR a Country Retail, Prescribing, and Dispensing business, a competent and energetic ASSISTANT, in-doors, able to Manage during the occasional absence of principal. Light hours. Time allowed for study or recreation. Address, SOMERSET, Baiss Bros. & Co., Jewry St., Aldgate, London, E.C. State age, experience, and salary required.

IMMEDIATELY.—A Junior ASSISTANT. Competent to take charge of a Branch. Of good appearance and address. From 3 to 4 hours daily allowed for recreation or study. State age, references, experience, and salary, in-doors. If possible, apply personally, otherwise forward carte and height to G. MORRIS, Chemist, Green Lanes, London, N.

ASSISTANTS WANTED.

ABOUT the middle of November.—An experienced and trustworthy ASSISTANT, to take charge of a Branch, for about 6 or 7 months. Would suit one requiring time for reading. A knowledge of Welsh preferred. Apply, stating full particulars and enclosing carte, E. O. F., care of Evans, Sons & Co., Hanover St., Liverpool.

AN out-door ASSISTANT. Not over 28 years of age. One accustomed to a country trade preferred. No Sunday duty. State age, height, and references, with salary required, out-door, to E. G. CARRINGTON, Chemist, Bakewell.

AN ASSISTANT, age about 22, who can Extract Teeth, in a light Retail (London). Apply, personally, or by letter, stating usual particulars, to P., Messrs. Flood & Co., 101 & 102, Blackman St., Borough, S.E.

FOR a good class suburban Dispensing business, where one Assistant only is employed. A gentlemanly ASSISTANT, with Minor qualification, who has had experience in a good house. Full particulars, with carte, or personal application, to BIRCH, Pharm. Chemist, Upper Norwood, S.E.

A WELL qualified ASSISTANT. Aged about 24. To take third place as Dispenser and general Assistant. Minor qualification. An abstainer preferred. Out-door. Apply, with carte, to BALKWILL & Co., 106, Old Town St., Plymouth.

A JUNIOR ASSISTANT. A good Dispenser, and well up in the general routine of a Mixed country business. Hours, from 7.30 until 8, on Thursday, until 5. No Sunday duty. Apply, stating age, height, salary required, with photo., if possible, to W. M. TURNER, St. Ive's, Hunts

MESSRS. FOSTER & ELSE, Brighton, have a vacancy for a Junior ASSISTANT. State age, references, and salary required, also enclosing carte.

IMMEDIATELY.—A competent and reliable ASSISTANT in a Mixed country business. Wesleyan preferred. Address, stating age, salary required, with references and carte de visite, if convenient, CHEMIST, Barclay Bros., 95, Farringdon St., London, E.C.

A JUNIOR ASSISTANT, accustomed to a good-class Dispensing and Family trade. Apply, stating age, height, salary required, and last references, to P. WILLIAMS, Pharmaceutical Chemist, Horsham, Sussex.

A JUNIOR ASSISTANT in light Retail business. Apply, stating age, experience and salary required, to A. WRIGHTON, 23, High St., Ilfracombe.

CLERK in a Wholesale house. Must be young, write a rapid, good hand, be quick at figures, and able to give unexceptionable references as to business and private character. Address, stating age and salary required, to I. C., care of C. R. Crossley & Co., 38, Poultry, E.C.

JUNIOR ASSISTANT. Minor qualification necessary. State age, salary required. Address, R. S., care of Orridge & Co., 32, Ludgate Hill, E.C.

AN ASSISTANT, not under 23. Competent, trustworthy, and a good and correct Dispenser. Apply, stating age, previous engagement and salary required, to E. POORE, Chemist, Broadstairs. Parties not receiving a reply by the 20th will consider their application declined.

AN active JUNIOR (with Minor qualification preferred), of gentlemanly appearance and address, for a good-class Dispensing business, &c. Apply to Mr. HALL, West Cliff Pharmacy, Folkestone.

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AN out-door Junior ASSISTANT, well up in both the Retail and Dispensing department. Apply, stating salary required, and enclosing carte and testimonials, to GOULDINGS, Chemists, Cork.

AN ASSISTANT, required for South Coast. Must be a quick and accurate Dispenser. Bedroom found, but not board. Apply, stating age, height, and usual particulars, to CURTIS & Co., 48, Baker St., London, W.

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ST. Saviour's Union, Surrey.—Appointment of DISPENSER. A licentiate of the Apothecaries' Company of London, or one who has been registered under the Pharmacy Act, 1868, or some other authority of law, is required, to discharge the duties of DISPENSER at the Northern Dispensary, 55, Blackman St., Borough, S.E., at a salary of £60 per annum and 12s. weekly in lieu of rations. The person appointed will also be provided with furnished apartments, gas, coals, and washing. Full particulars of the duties, or any other information required, may be obtained on personal application to the undersigned. Applications must be made on forms obtainable at my offices, which must be returned before noon on Thursday, Sept. 21 next. Canvassing the Guardians is strictly prohibited, and will disqualify any candidate.

By order, HOWARD C. JONES.

Clerk's Offices, John St. West,
Blackfriars Rd., S.E., Sept. 8, 1882.

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3A.	Silver-plated Wire, Silk Velvet Pads	,, ,,	2 6	,, 0 18 0
4.	,, ,, ,, ,,	,, ,,	3 0	,, 1 1 0
5.	,, ,, ,, ,, Without Ends	Square ,,	4 0	,, 1 8 0
5A.	,, ,, ,, ,,	,, ,,	3 6	,, 1 4 0
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11.	,, ,, Gold-plated, ,,	,, ,,	6 0	,, 2 2 0
12.	,, ,, Silver-plated, Gents'	,, ,,	6 0	,, 1 16 0
13.	,, ,, Gold-plated, ,,	,, ,,	7 6	,, 2 8 0
	(*The Aerials may be had covered with black or drab.*)			
14.	Gold-plated Wire, full size	,, ,,	7 6	,, 2 8 0
15.	Gold Plates, full size	,, ,,	7 6	,, 2 8 0
16.	Orinasal, Silver-plated Wire	Square ,,	4 0	,, 1 10 0
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18.	,, ,, Gold-plated	,, ,,	6 0	,, 2 2 0
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20.	Ditto ditto ditto ditto	Oval ,,	10 6	,, 3 12 0
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22.	,, ,, Gold-plated	,, ,,	6 0	,, 2 2 0
23.	The Cotton-wool Respirator, Silver-plated	Orinasal ,,	5 0	,, 1 16 0
24.	,, ,, Gold-plated	,, ,,	8 6	,, 3 0 0
25.	,, ,, ,,	Oval ,,	5 0	,, 1 16 0
	(*As recommended by Professor Tyndall.*)			

Nos. 1, 2, and 3 ... ... Contain 1 Metallic Plate.
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CHEST PROTECTORS.

(Full Standard Sizes, best quality Scarlet or White Felt.)

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 1. Red or White Felt	No. 0, 6/-	1, 7/6	2, 9/6	3, 11/6	4, 14/-	5, 20/-	per doz.
,, —Chamois Skin, Lined with Flannel	No. 0, 6/-	1, 8/-	2, 11/6	3, 13/6	4, 16/-	5, 20/-	,,
Fig. 2.—Ladies' Shape, Red or White Felt (B. and T.'s Pattern)							
No. 1. Size 11 by 11						16/-	,,
,, 2. ,, 12 by 12						20/-	,,
,, 3. ,, 13 by 13						24/-	,,
Fig. 3.—Vests for the Chest and Back, Red or White Felt	No. 1, 27/-	2, 36/-	3, 42/-	4, 48/-			,,
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Fig. 5.—The "Bon Ton," Quilted Satin, Very Handsome	No. 1, 18/-	2. 21/-	3. 24/-				,,

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The
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AND
Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 4th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The Sessional Prizes and Certificates will be distributed at this Meeting. Successful Candidates will be expected to attend. An Address to the Students will be delivered by JOSEPH INCE, F.C.S., F.L.S. *All Students and friends, ladies and gentlemen, are invited to be present.*

LIBRARY AND MUSEUM.

SPECIAL NOTE.

The Library and Museum will be closed during the whole of September, for the usual annual revision, and for repairs.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

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£35 per annum to pensioners 65 years of age and upwards.

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Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

CATALOGUE OF THE MUSEUM.

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On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

At 8 p.m. on Wednesday, October 4th, the School Prizes will be distributed, and an Address to the Students be delivered by JOSEPH INCE, *F.C.S., F.L.S. All Students and Friends, ladies as well as gentlemen, are invited to be present.*

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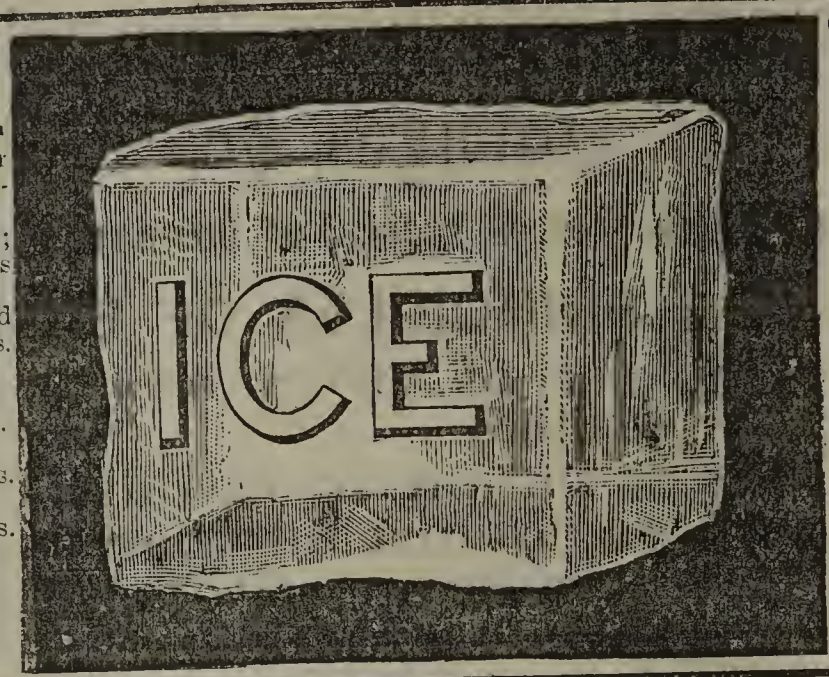

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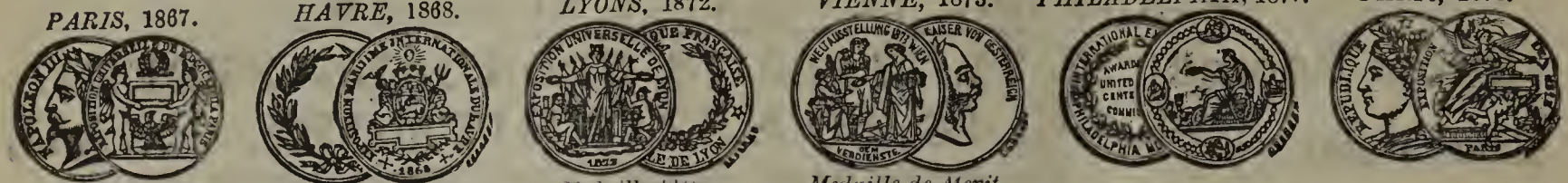

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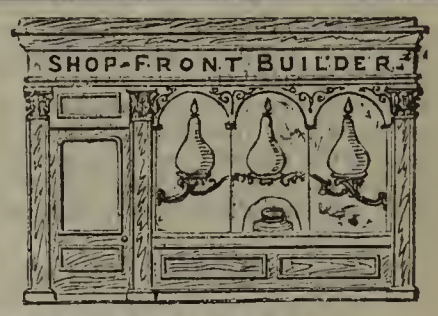

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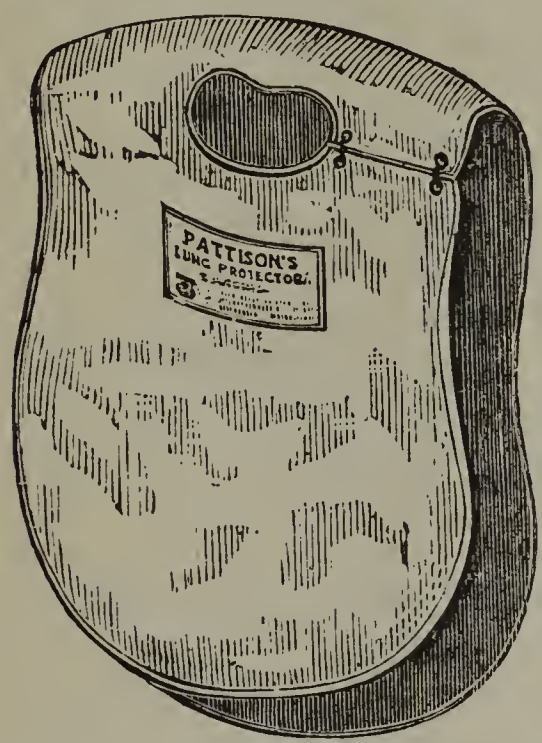

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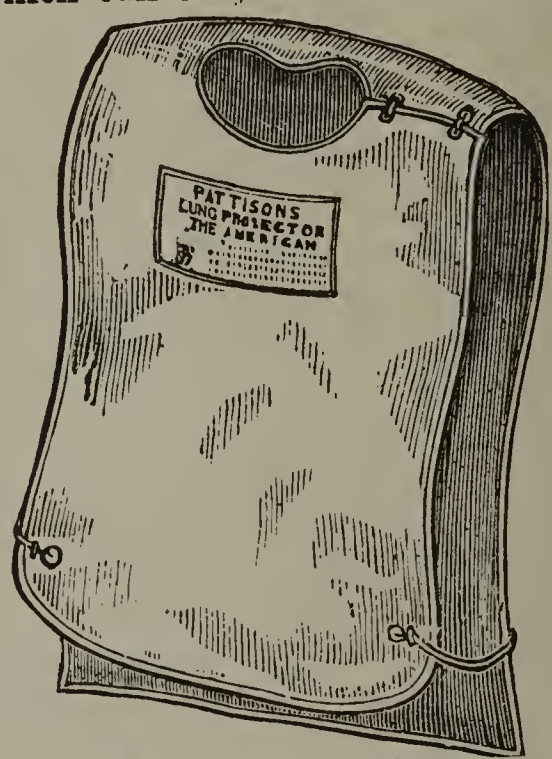

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FELT CHEST PROTECTORS.

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THE INTERNATIONAL ELECTRIC EXHIBITION.

(*Concluded from page* 222.)

Among the modifications of Planté's important discovery that have been made there is probably none of them so well known as regards the name as the modification by Camille Faure, of Paris. As will be gathered from preceding statements, the Faure cell consists of two lead plates covered in the first instance by red lead. This coating being in a very loosely attached condition it is necessary to support it by wrappings of felt, and thus constituted it will be seen that M. Faure's modifications of Planté's great work are of a very simple character. It must, however, be admitted that Faure's combination possesses merit. According to M. Géraldy the Faure cell can store 3·28 kilogrammètres per kilogram, or 10·79 foot pounds per pound of lead. The most comprehensive comparison of the two accumulators that has yet appeared is due to Professor Silvanus Thompson, of University College, Bristol, who, in a paper read before the Society of Arts, has presented such a complete *résumé* of the whole subject of "Storage of Electricity" as to make that paper of the utmost value to anyone seeking definite information on this interesting and important subject. The comparison of the Planté and Faure accumulators is so compact, and yet comprehensive, that it is advisable to quote it direct:—

"No very reliable comparisons between the accumulators of Planté and those of Faure, or of De Méritens, have yet been made. Seeing that in each of these, when completely formed, the materials are the same—namely, lead and peroxide of lead immersed in dilute sulphuric acid—the maximum electromotive force must be eventually the same in each. The resistance of a cell is simply a question of size and shape. The relative strength of current actually furnished by these cells should therefore merely vary with their dimensions. The presence, however, of the felt, and its coatings of red lead, introduces resistance into the Faure cell, and as some recent determinations of M. Achard show, a Planté cell will heat a greater length of platinum wire, and do its work three times as quickly as a Faure cell, whose surface is of the same amount. One would also expect *à priori* that the layers of peroxide, formed upon the electrode by the working of the current itself, should be more regular, and yield currents with greater regularity, than the artificial and more rapidly-formed layers made by painting red lead upon the surface. On the other hand, M. Faure points out that taking cells of equal size, a larger proportion of the weight in his cell consists of the working substance, the weight of red lead placed in his cells being, for equal amounts of surface, about twenty-six times as much as the weight of peroxide produced by a "formation" during two years on the plates of a Planté cell of equal size. If this be so, it would imply that, though its resistance might be greater, and its rate of working slower than the Planté cell, the Faure cell would accumulate twenty-six times as much energy in an equal space. These figures require yet to be confirmed, and they are hardly borne out by the statistics of M. Regnier. Still less do they justify the extravagant pretensions that have been ignorantly set up on behalf of the enormous powers of the Faure cell—pretensions which have been angrily combated, though it is well to note that neither M. Planté nor M. Faure have taken part in this unpleasant recrimination. The Faure cell will do what the Planté cell will not, take in a greater charge, because it has a greater thickness of the working material, and it gives up its charge less rapidly. The Planté cell will do what the Faure cell of equal weight or surface cannot do, namely, produce rapid discharges in currents of greater volume; a property invaluable for the purpose of some of the applications already named."

The applications that had been previously mentioned were the application of the Planté cell for the operation of cautery, M. Trouve's surgical appliances including very small incandescent lamps to illuminate the cavities of the body—operation upon the larynx is given as an example—and dentists' appliances for destroying the nerves in hollow teeth; also, M. Achard's brake for railway trains, and M. Trouve's application of accumulators for propelling a tricycle up to a speed of 10 miles an hour are fully detailed. Amongst other applications especially deserving of notice are those describing the possibility of obtaining a powerful arc light for a few minutes from twenty cells, which time would be sufficient for some class experiments and for private spectroscopic work, also for photographic work, thus obviating the labour and expense of setting up fifty Grove cells. Further applications of accumulators appeared in *Nature* on June 2, 1881, in an article on "Electric Storage," by Professor Silvanus Thompson in the following words:—

"The uses for such secondary batteries may be of three kinds:—1. They may serve as portable supplies of electricity to be left and called for to recharge when exhausted. 2. They may serve to accumulate supplies of electricity from dynamo-electric machines, and store them until required for furnishing electric light or motive power on a small scale. 3. They may serve as equalizers of electric currents in a system in which the supply is liable to fluctuations. Suppose, for example, a dynamo-electric machine is employed to produce electric light. Any least thing which alters the speed of the machine, even for an instant, makes the light flicker and change in intensity; while the breakage of the engine-strap would at once cause total darkness. But if a secondary battery of suitable dimensions and power were inserted across the circuit between the dynamo-machine and the lamp, the inequalities of the current would be greatly modified. When the light was not in use, the battery would store up the current. If the engine failed, the battery would at once put forth its power. It is probably in this direction that the secondary battery will find no unimportant field of usefulness."

Other forms of accumulator have been devised by M. De Meritens, Swan, Sutton, Sellon and Volckmar, and some few others.

The De Meritens accumulator is a modification of Planté's form. The lead plates are made to overlap each other after the manner of venetian blind laths, the whole being secured to a stout outer framework of lead. This arrangement gives a greater effective surface in the space. The plates require forming as in Planté's cells.

The Swan accumulator is a modification of the Planté cell also. In this design, the surface of the lead plates is increased by forming lead foil into frillings, the interstices being filled with electolytically deposited lead.

The Sutton cell is a departure from all the preceding forms; it was fully described in this Journal, in the "Month" ([3] xii., 625). A great wonder connected with this form of accumulator is that it is entirely untrammelled by patent rights, a sufficiently astounding thing in these days. The cell appears to have given satisfaction to several amateurs who have constructed it.

No authorized description of the Sellon-Volckmar accumulator has yet been published, but from what little has been in print it would appear to be a decided improvement on the Faure cell, following

closely in principle on that of Swan, whose patents have indeed been purchased by Mr. Sellon in order to save any future complications in the matter.

It may be mentioned here, that Mr. W. Symons, F.C.S., a well-known member of the pharmaceutical body, has published, in the pages of the *English Mechanic*, a description of an accumulator which would seem to be a useful and tolerably simple cell to construct. The acting materials are lead plates prepared by covering (on one side apparently) with red lead, the plates being immersed in an acidulated solution of sulphate of copper. If this article should induce any readers to attempt the construction of these fascinating and instructive electolytic apparatus, perhaps a few practical remarks on charging may be useful. As the electromotive force of a Planté, or Faure, or almost any other form of accumulator, may be taken as over two volts, it follows that the charging current must have an electromotive force greater than this, otherwise, the cell cannot be charged to its full power. This will necessitate the employment of two Grove's or Bunsen's cells or three Daniel's to one accumulator. If more than one accumulator is to be charged, the two or three primary cells can still be used if the secondary cells or accumulators are connected in multiple arc during the charging. As to when the charging is finished, this might be told by a galvanometer in circuit, or, perhaps, just as well by watching for escape of free oxygen at the peroxide plate. Too great an electromotive force should be avoided in charging the cells, as, although the charging is quicker, a great waste of current takes place in the form of local heat.

An important point is to have sufficient current density in charging, as the maximum polarization will not be attained unless there is sufficient current at every point of the area of the plates. According to Professor Silvanus Thompson it should not be less than 50 milliampères per square centimetre of surface in the cell. This would be found by ascertaining the current in the circuit in ampères, and dividing the total area of the plates in centimetres by the current found in the circuit.

According to the same authority there is a decided gain in forming a Planté cell by scratching the leaden surfaces.

This article forms the conclusion of this series of papers. At the commencement it was intended to describe the principal contents of the Crystal Palace Exhibition. It, however, appeared desirable to give a much more detailed description of the chief dynamo machines and lamps than would have been possible if the Exhibition had been noticed in the usual manner, which can only be done with advantage when readers are expert in the subject-matter of the descriptions; in this instance it was thought that the articles would be of greater utility if the reverse was assumed.

SOLUTION OF ACETATE OF ALUMINIUM.

The preparation of this valuable antiseptic, which is much used in continental hospitals, has heretofore often given annoyance by its tendency to deposit insoluble sediments, or by its readiness to gelatinize. It is owing to the labours of Professor Poleck, of Breslau, that the cause of this trouble has been ascertained and a process been devised which removes the drawback.

Professor Poleck confirms the previous statement of Walter Crum, that, on bringing together acetate of lead and sulphate of aluminium, there will be obtained as products, sulphate of lead, basic aluminium acetate, and free acetic acid. This latter was found to effect the change of the basic acetate into the insoluble modification, and it was therefore necessary to remove or neutralize it. This was accomplished by the following process, in which the sulphate of aluminium is assumed to contain 95 per cent. of the true salt, the remainder being the usual impurities found in the commercial article.

300 parts of sulphate of aluminium are dissolved in 800 parts of water, and the solution mixed with 360 parts of diluted (Germ. Pharm.) acetic acid (spec. grav. 1·041).

130 parts of precipitated carbonate of calcium are mixed with 200 parts of water, and the mixture gradually added, under stirring, to the former. The whole is allowed to stand for twenty-four hours at the ordinary temperature, being stirred occasionally; afterwards it is strained, the precipitate pressed without washing, the liquid allowed to settle, and finally filtered.

The filtered liquid has the specific gravity 1·0457. It will amount to about 1275 parts. It is clear, colourless, and has only a faintly acetous odour. On the addition of 2 per cent. of sulphate of potassium, and heating on the water-bath, it becomes gelatinous; on slow cooling, it becomes clear and liquid again after a short time.

The products of two different preparations by the above method had the following composition, showing that it is quite uniform:—

	I.	II.
Acetate of aluminium $Al_2(C_2H_3O_2)_4.H_2O$ . . .	7·76 per cent.	7·69 per cent.
Alumina, Al_2O_3. . . .	0·47 ,,	0·23 ,,
Calcium sulphate, $CaSO_4$	0·41 ,,	0·33 ,,
Spec. grav.	1·0457	1·0455

Dr. Vulpius, of Heidelberg, communicates his experience in following the above process. He states that it offers no difficulty at all, provided very capacious and shallow vessels are used, since the introduction even of small quantities of carbonate of calcium causes an energetic effervescence, particularly when working on the large scale. After the reaction is completed, the product appears to consist of an enormous quantity of precipitated sulphate of calcium with a very small amount of supernatant liquid, and, at first sight, it would seem as if the process were defective, since it might be supposed to be difficult to separate any useful quantity of liquid from the precipitate. This is a deceptive appearance, however; for, although but a small quantity of liquid runs off, at first, from the strainer, it is only necessary to slightly press the latter in order to effect a rapid disengagement of the liquid and a contraction in bulk of the precipitate. If the strainer is subjected to the action of a moderate press, the precipitate dwindles down to an insignificant amount. Dr. Vulpius proposes, in preparing large quantities of the solution, to use centrifugal machines for the separation of the precipitate from the liquid.

After the liquid has been allowed to stand for a short time, it filters clear and rapidly, and does not become turbid on standing.

Three kilograms of sulphate of aluminium, 3·6 kilos. of dil. acetic acid (spec. grav. 1·041) and 1·3 kilos. of carbonate of calcium, with the prescribed quantity of water, yield, in a round figure, 13 kilos. of solution of acetate of aluminium, containing $7\frac{1}{2}$ to 8 per cent. of two-third basic acetate of aluminium $[Al_2(C_2H_3O_2)_4.H_2O]$.—*New Remedies.* After *Arch. der Pharm.*

THE CHINESE DRUGGIST IN NEW YORK.*

BY FRED. HOHENTHAL.

The Chinese drug store here, the only one this side of San Francisco, was established by "Kwong Lung Jin," in 1878, and he is doing a flourishing business among his

* From the Eleventh Annual Report of the Alumni Association of the College of Pharmacy of the City of New York, 1882.

people now. The proprietor is a stout Chinaman, about thirty-five to forty-five years of age, very intelligent, revered by his countrymen, but not so well versed in English as his assistant, who is about ten years younger. I experienced much trouble on my first visit in assuring him that I was not a customs officer ferreting out his opium trade, but on seeing my readiness to buy little trifles, he immediately installed me in his good graces, and invited me to dine with him.

The store is a small apartment, about 20 by 30 feet, with sleeping rooms, kitchen, parlour, etc., in the rear. There were shelves all around covered with bottles and jars, and the top shelf mounted by many paper packages, cabalistically marked, and containing roots and herbs in great variety. In a small case behind the counter were the few mineral drugs, and a good many little trifles not belonging strictly to pharmacy, such as porcelain jars, pencils, scallops, beads, rings, etc. There were also some animal drugs, of which I will speak of later on.

Pendent from the ceiling were bunches of herbs and dried meat. On the floor, under the shelves, were articles of food, such as barrels of rice, flour, dried fish, etc. There were also about forty drawers behind the counter for the most used drugs, those in packages being very seldom used. Large jars were filled with different pleasant-tasting fruits, not used as medicines, and smaller glass jars with the various medicinal fruits, of which there was a large number, the chief uses of which seemed to be in the cure of consumption, a disease the Mongols seemed to be peculiarly liable to, judging from the fact that about 10 per cent. of their medicines are for its cure.

They have no liquid medicines whatever; they simply sell the drugs, extolling their virtues, and the purchaser or patient prepares them with boiling water in the form of infusion or decoction and sometimes extract, unless he has not the conveniences therefor at home, when the apothecary will do it for him. As an accommodation for his customers, the doctor keeps a pot of hot tea on the counter; anyone wishing to drink takes a cup from a basin of water near by, fills it, drinks, and replaces the cup without saying a word. A peculiarly constructed tobacco pipe, on the principle of the Turkish narghileh, is also on the counter, but only for the use of intimate friends. The tobacco they use is very fine and of peculiar flavour. Their tobacco pipes, the common kind, are made of a rod of bamboo strung with the kernels of a peculiar scented nut, and furnished with a bowl of metal about ½ inch in diameter and ½ inch deep, and an ivory mouth-piece. The pipe is perfectly straight and 2 feet long; they vary in price, from 2 dollars 50 cents to 7 dollars, according to age; those which have been already smoked for some time sell for more money than new ones.

Their balances are on the plan of the steelyard, the small ones with a bar of ivory, from which is suspended a brass pan and a moveable brass weight; one in my possession is 12 inches long and has over 125 marks for telling the weight, which ranges from 2 ounces downwards to 2 or 3 grains, very accurately. They have these balances of all sizes, and use them with great dexterity.

Their camels' hair pencils are about 10 inches long, of bamboo, into one end of which the brush is inserted, and it is fitted with a cover also of bamboo, the whole stem being curiously carved with their strange devices, and these cuts filled out with blue colouring.

Their writing materials are the pencil above described, an iron or porcelain plate, 6 by 8 inches, with a receptacle for water. They dip a piece of Indian ink in the water, rub it on the plate, and rub the pencil in this mixture and write from above downwards.

They have some very pleasant fruits: one of these, the "gua," is about the size of a walnut, and consists of a kernel as large as a hazel-nut, surrounded by edible fleshy pulp, and the whole enveloped in a hard, brown, brittle shell.

Among the familiar drugs I found Spanish saffron, safflower, musk, litharge, metallic mercury, ginger, ginseng, oil of peppermint.

I found also Russian castor and American castor, and what was claimed to be from the bear.

Also, fine Chinese isinglass, in one piece just the size and shape of an ordinary flounder, and which he wanted to sell me for two dollars. He called it by a name that resembled "Guiteau."

I found also several narcotic herbs resembling belladonna, hyoscyamus, stramonium, also a root resembling glycyrrhiza, only much larger in diameter than that is usually found. It is called "Gum Cho" and is used for chewing on account of its sweet taste.

Among the most notable goods was a substance in small lumps of yellow colour, and called "Nau Wau." It occurs, in lumps about the size of a walnut, in the stomachs of cows. The doctor said that it is found only in one cow in a hundred. It is used to apply to a sore foot in the form of paste, and is used only by the aristocracy.

There was a peculiar bark called "Os Chong," remarkable for the silky fibres it shows on breaking it in any direction; it is used in the form of a decoction for weakness of the heart. The price is ten dollars a pound. There were also dried lizards, which are to be boiled and eaten. There were disinfecting fumigators, strips of bamboo about one foot long, and as thick as a hair-pin, which were covered on the upper half with a fragrant mass, which glowed for two hours when once lit, perfuming the rooms very pleasantly. They were called "Sau Hong."

STUDIES ON THE ALKALOIDS.

BY DR. W. KOENIGS.*

ANNOTATED BY M. DE BECHI.

(*Continued from page* 128.)

Part II.—Chinoline and Lepidine.

Chinoline was discovered by Gerhardt in 1842.† By treating quinine with caustic potash and a little water, he obtained, with evolution of hydrogen, an oxygenated base $C_{18}H_{22}N_2O_2$, which he named quinoleine. By treating cinchonine‡ in the same manner, he found that the quinoleine obtained contained no oxygen. It is now known, through the researches of Butlerow and Wischnegradsky,§ that quinine gives an oxygenated base, $C_{10}H_9NO$, quinolidine, whilst cinchonine gives chinoline, C_9H_7N. The actual formula of chinoline has been settled by Laurent,|| from some recent analyses of Gerhardt.

In his researches on the bases of coal-tar, Hofmann¶ studied, besides kyanol or aniline, the leucol of Runge, and proved its identity with the chinoline of Gerhardt; these two bases giving with chromic acid the same characteristic yellow precipitate. According to Hofmann, the oil of coal-tar, which he used in his researches contained ⅔ per cent. of leucol and ⅓ per cent. of aniline. Later, the identity of leucol with chinoline was called into question by Gr. Williams** who, in studying the decomposition of cinchonine by potash, discovered two superior homologues of chinoline, lepidine, $C_{10}H_9N$, and cryptidine, $C_{11}H_{11}N$;

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* 'Studien über die Alkaloide.' By Dr. W. Koenigs. Munich: F. Straub, 1880. With annotations and additions referring to recent researches by M. de Bechi. Translated from the *Moniteur Scientifique*. The additions are included within brackets.

† *Annalen*, vol. xlii., p. 310.

‡ *Idem*, vol. xliv., p. 279.

§ *Berichte*, 1879, p. 2093.

|| *Annalen*, vol. lxii., p. 101.

¶ *Idem*, vol. xlvii., p. 37; vol. liii., p. 427.

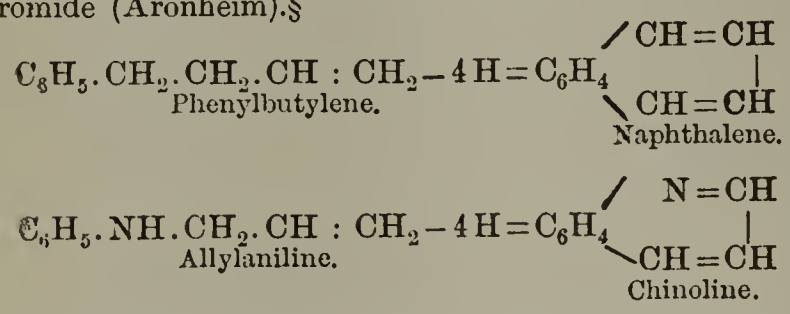
** *Journal für praktische Chemie*, vol. lxvi., p. 334; *Jahresbericht*, 1869, p. 361.

he also recognized the tertiary nature of chinoline. According to Liebig and Woehler,* by the action of cyanic acid upon aldehyde, trigenic acid, $C_4H_7N_3O_3$, was obtained, which, when heated, became charred and gave off chinoline together with cyanuric acid.

Thialdine, $C_6H_{13}N_2$, obtained by the action of sulphuretted hydrogen upon ammonic aldehyde, to which a little ammonia had been added, yielded, when heated to redness with lime, some chinoline, which was recognized by its characteristic odour and its double platinic salt. Nevertheless, it is very probable that the base thus obtained by Liebig and Woehler was collidine, which presents properties analogous to chinoline and which is formed, according to Baeyer and Adorf† by distillation of ammonic aldehyde.

Lubavin‡ studied in Baeyer's laboratory, in 1869, the chinoline accruing from cinchonine and obtained from it two well crystallized substitution products, a sulphoconjugated acid and a tribromated derivative. Such was the state of our knowledge of chinoline when the author undertook, three years ago, some researches on chinoline and cinchonine.

Koerner's theory concerning the constitution of chinoline, has already been mentioned. If it be correct it ought to be possible to obtain chinoline from allylaniline, as naphthaline is produced from phenylbutylene or its bromide (Aronheim).§

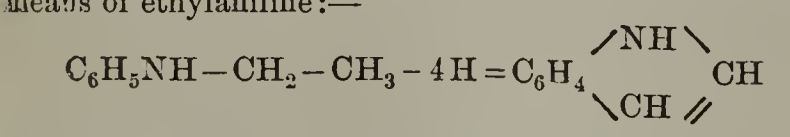


Perkin had already tried to oxidize allyltoluidine in the hope of obtaining quinine. Instead of quinine, he obtained, by mixing the substituted base with a bichromate solution, a dirty-brown precipitate. It is known, how, in studying the oxidation of a simpler base, aniline, he was led to the discovery of the violet which bears his name and which was the first artificial colouring matter obtained from aniline.

If the vapour of allylaniline be passed over oxide of lead, heated to dull redness, a liquid with a benzonitrile odour is obtained. The product is purified with sulphuric acid; the precipitate of sulphate of aniline is filtered and the liquid shaken with ether; the acid solution is boiled with solution of potassium bichromate, until a filtered test is no longer altered by the oxidizing mixture. The liquid is then made alkaline and distilled with steam; when some oily drops pass over, having the odour of chinoline, the double platinum salt of which corresponds to the formula:—

$$(C_9H_7N.HCl)_2 . PtCl_4$$

The formation of chinoline from allylaniline answers to the synthesis of indol effected by Baeyer and Caro by means of ethylaniline:—



and it may be admitted that in the formation of chinoline, the side chain is condensed in the ortho position, as takes place with indol and naphthaline, by means of phenylbutylene.

From this the formula of Koerner became very probable and it was clearly demonstrated by the beautiful synthesis of chinoline effected by Baeyer with hydrocarbostyrile. By reduction of orthonitrophenylacetic acid, Baeyer* obtained oxindol which, treated with phosphorus pentachloride, gives chloride of oxindol; this last, treated with hydriodic acid in acetic solution, gives retinindol, C_8H_8NO or C_8H_9NO, which yields indol by dry distillation.

If, instead of oxindol, its homologue, hydrocarbostyrile or orthoamidohydrocinnamic anhydride be operated upon, bichlorochinoline, $C_9H_5Cl_2N$, is first formed, a feebly basic body, which, treated with hydriodic acid in acetic solution at 240° C., gives chinoline.†

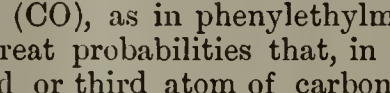
In successively nitrating and reducing the phenylangelic acid obtained by Perkin by means of essence of bitter almonds and normal butyric acid, Baeyer and Jackson obtained a homologue of hydrocarbostyrile, ethylhydrocarbostyrile, which separates in the form of a neutral anhydride from the acid mixture of isomeric amide acids. This body treated like hydrocarbostyrile, gives ethylchinoline and intermediary products.‡

The chloride of phosphorus does not here effect a substitution, for the second place (starting from the nitrogen) is taken by ethyl. Ethylchinoline has some properties analogous to chinoline; the small quantity at disposal did not allow it to be ascertained whether it is identical with cryptidine, and whether it gives cinchonic acid or an isomeric product by oxidation.

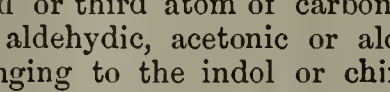
The researches of Baeyer and Jackson have shown that homologues of hydrocarbostyrile can be prepared, whenever the corresponding coumarine exists. The existence of homologues of chinoline with more than 5 atoms of carbon in the side chain is improbable, for, according to Baeyer and Jackson, corresponding hydrocarbostyriles do not seem to be formed, as, for example, by the nitration and reduction of normal phenylvaleric acid.

$$C_6H_5.CH_2.CH_2.CH_2.CH_2.CO_2H.$$

Baeyer and Jackson infer from these facts that the amido group, in the ortho position, combines readily with the second or third atom of carbon in the lateral chain, but not with atoms more remote. A chinolic body is also directly formed, when the third atom of carbon does not exist in the state of carboxyl, but in that of carbonyl (CO), as in phenylethylmethylacetone, and there are great probabilities that, in every case in which the second or third atom of carbon exists in the condition of an aldehydic, acetonic or alcoholic group, anhydrides belonging to the indol or chinoline§ group are formed. To prove this theory, Baeyer and Jackson prepared by means of phenylacetone, an isomer of scatol, the intramoleculary anhydride of orthoamidophenylacetone:—



which they named methylketol; it is a homologue of the unknown ketol:—



which should be isomeric with indol. Methylketol behaves in a manner entirely analogous to indol. As has been seen, indol is closely related to chinoline, a fact which could hardly have been expected, since these two bodies present entirely different properties. Whilst chinoline is an energetic tertiary base, which distils without decomposition, and is remarkable for its stability, indol is only a very weak base, of which the salts are decomposed even by boiling with water; it is partially decomposed by distillation and is generally very unstable: it contains an imide group, for it gives an acetyl compound.‖ In pyridine, C_5H_5N, and pyrrol,

* *Annalen*, vol. lix., p. 291; vol. lxi., p. 1.
† *Annalen*, vol. clv., p. 311.
‡ *Idem*, vol. clv., p. 311.
§ *Berichte*, 1873, p. 67.

* *Berichte*, 1879, pp. 456, 459 and 1313.
† *Idem*, 1879, pp. 60 and 1320.
‡ *Berichte*, 1880, p. 115.
§ *Berichte*, 1880. p. 187.
‖ *Berichte*, 1879, p. 1313.

C_4H_5N, the same analogies occur as in chinoline and indol.

Pyrrol therefore constitutes the nitrogenated ring of indol, as pyridine does that of chinoline; this latter theory is proved by the oxidation of chinoline to the state of pyridino-dicarbonic acid.

By the conversion of hydrocarbostyrile into chinoline, the constitution of this base has been established with certainty. The author was compelled, however, to seek some more convenient methods of preparation than those accomplished by means of hydrocarbostyrile or allylaniline.

By dry distillation of acroleine-aniline, 70 per cent. of chinoline is obtained, which is analogous to the production of picoline with acroleine-ammonia by Baeyer.* Acroleine-aniline, prepared by Schiff's method† is distilled in small retorts in portions of 25 grams. An abundant charred residue remains; the distillate is purified by the method mentioned by Baeyer for picoline, which consists of treating the base with an oxidizing mixture of potassium bichromate and sulphuric acid. The liquid is made alkaline, distilled with steam, and the chinoline afterwards extracted with ether.

Acroleine-aniline, which, according to Schiff, has the formula $C_{18}H_{18}N_2$, should give two molecules of chinoline with a loss of 4H. The yield is, however, very weak. A base, boiling at a higher temperature than chinoline, appears to be formed at the same time as that substance. If oxidized directly, acroleine-aniline gives no trace of chinoline.

A still more simple method of preparing chinoline was indicated in the work of Graebe upon alizarine blue.‡ Graebe obtained, by reduction of the blue by means of zinc powder, an energetic, non-oxygenated, tertiary base, which he named anthrachinoline. He considers that anthrachinoline is to anthracene what chinoline is to benzine.§ It was natural, therefore, to have recourse to the action of sulphuric acid and glycerine upon nitrobenzol for the preparation of chinoline. Nevertheless, only a few traces of chinoline were obtained thus. The action of aniline (1 part upon a mixture of 1½ to 2 parts of sulphuric acid and 1 part of glycerine at 180–190° C.) gave the desired result; acroleine-aniline is probably formed at first, and this, whilst in the nascent state, is oxidized by the sulphuric acid into chinoline, with an abundant evolution of sulphurous acid.

These two methods have been also indicated by Skraup at the meeting of the Vienna Academy of Sciences, April 8, 1880. Skraup also gave a much superior method to the preceding, since it gave him 70 per cent. of chinoline from the mixture employed; this method consists in replacing the aniline by a mixture of aniline and nitrobenzol. Here also acroleine-aniline is probably formed at first and is oxidized by the oxygen of the nitrobenzol to form chinoline, whilst the remaining C_6H_5N of the nitrobenzol, uniting with the acroleine, gives another molecule of chinoline with elimination of water.

[*Preparation of Chinoline.*

The following is the process for the artificial preparation of chinoline, as given by Skraup:‖—

Twenty-four grams of nitrobenzol, 38 grams of aniline, 120 grams of glycerine and 100 grams of concentrated sulphuric acid are placed in a vessel having a capacity of 2 litres, and the mixture, which becomes hot, is agitated until the aniline sulphate formed is completed dissolved; it is then connected with a return condenser and heated upon a sand-bath. After five or ten minutes an energetic reaction sets up when the flame must be immediately removed. At first only a small quantity of vapour is given off, but after a few moments the ebullition becomes tumultuous. The reaction ceases after a few minutes, but after a short interval recommences and this takes place several times. Finally the reaction is brought to an end by heating during two or three hours, until the nitrobenzol has completely disappeared. The reactions are represented as follows:

$$\underset{\text{Nitrobenzol.}}{C_6H_5NO_2} + \underset{\text{Glycerine.}}{C_3H_8O_3} = \underset{\text{Chinoline.}}{C_9H_7N} + 3H_2O + O_2$$

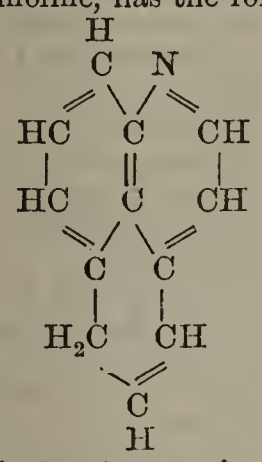
$$\underset{\text{Aniline.}}{C_6H_5NH_2} + \underset{\text{Glycerine.}}{C_3H_8O_3} = \underset{\text{Chinoline.}}{C_9H_7N} + 3H_2O + H_2$$

$$\underset{\text{Aniline.}}{2C_6H_7N} + \underset{\text{Nitrobenzol.}}{C_6H_5NO_2} + \underset{\text{Glycerine.}}{3C_3H_8O_3} = \underset{\text{Chinoline.}}{3C_9H_7N} + 11H_2O$$

The base is separated either by adding caustic soda in excess and distilling in a current of steam or extracting it by means of ether from the solution rendered alkaline. The former method is preferable as giving a purer product. The crude chinoline is dried and distilled over potash; in the first distillation it passes over between 225° and 230° C., but after twice repeating the operation it passes over between 227° and 228°. The alteration of crude chinoline in the light is due to the presence of a small quantity of non-basic resin, which is difficult to eliminate by simple distillation. To obtain the base quite pure it may be boiled in sulphuric solution with potassium bichromate, or dissolved in six parts of alcohol and the theoretic quantity of strong sulphuric acid added to the alcoholic solution. After cooling, it is filtered, and the residue washed with alcohol; the acid sulphate thus obtained, which is snow white, is then decomposed by caustic potash. Pure chinoline is completely colourless and may be preserved for a long time, especially if sheltered from light.]

The ideas of Graebe upon the constitution of alizarine blue have received a brilliant confirmation by the synthesis of chinoline by Skraup, who has generalized the reaction, by employing, instead of nitrating derivatives, the different amide derivatives, which, according to a communication by Skraup, react very easily upon the mixture of glycerine and sulphuric acid.

Another method of forming chinoline, which, without being synthetical, presents a certain amount of interest, has been discovered by Graebe and Caro.* By oxidizing acridine, which is found in great quantities in coal tar, by means of a dilute solution of permanganate, these chemists obtained acridic acid, a bicarbonated acid of chinoline, $C_9H_5N(CO_2H)_2$, which, distilled with calcic hydrate, gives chinoline. Acridine, which is a tertiary base as stable as chinoline, has the formula—



Of all these methods of preparing quinoline, there is no doubt that Skraup's mode is the best on account of the cheapness of the material employed, the facility of preparation, and above all the purity of the product obtained.

Subsequent researches on the action of reducing agents upon chinoline show that it is very difficult to obtain by the old process of preparing chinoline by means of cinchonine, a product entirely free from

* *Annalen*, vol. clv., p. 281.

† *Idem*, supp. iii., p. 343.

‡ *Moniteur Scientifique*, 1879, p. 1201; 1880, p, 483. *Annalen*, vol. cci., p. 333.

§ Since morphine, $C_{17}H_{19}NO_3$, can be distinctly split up by the alkalies, it is possible that anthrachinoline, $C_{17}H_{11}N$, may be its fundamental pyridic derivative.

‖ *Monatshefte f. Chemie*, 1881, p. 139.

* *Berichte*, 1880, p. 99.

lepidine, which is very troublesome in that it sometimes modifies the analytical results and the melting points of the different derivatives.

(*To be continued.*)

CAFFEIC ACID FROM CUPREA BARK.*

BY G. KÖRNER.

The raw material upon which the author experimented was supplied to him by the Lombardy Manufactory of Chemical Products, and was distinguished from other qualities of cinchona bark by giving a reddish-violet colour when a solution of potassic hydrate was added to its aqueous extract. The most important fact discovered by the author while pursuing his researches was that during the manufacture of sulphate of quinine from this bark there is formed a notable quantity of caffeic acid, which is evidently produced by the breaking up of a complex substance existing in the bark in company with the alkaloid. The caffeic acid is found in the mother-liquors as caffeate of quinine. This salt is obtained by repeated evaporation and fractional crystallization in slightly coloured mammilar crystals, which on being treated with dilute sulphuric acid and exhausted with ether sometimes give caffeic acid, but at others an acid which is obtained in such small quantities that it has not yet been studied. The mother-liquors turn brown when in contact with the air and deposit on the sides of the vessel containing them a dark powder, resembling in this respect solutions of caffeic acid and protocatechuic aldehyde. They also often give off an odour closely resembling that of vanilla.

The process adopted by the author for preparing the acid from the bark is as follows, the yield being about 0·5 per cent:—

The powdered bark is extracted with ether and then treated with boiling alcohol until nothing more is dissolved out. The alcoholic solution is then evaporated to dryness and the residue is treated with two and a half times its weight of boiling water, its own weight of caustic potash is added, and the whole is kept boiling for three hours. The liquid is then superaturated with dilute sulphuric acid, filtered while hot and shaken up with an excess of ether. The ethereal solution is then concentrated until crystals, accompanied by a syrupy liquid, are formed, the latter being separated by repeated washings with very small quantities of ether. The crystals are recrystallized from a boiling solution which has been previously submitted to the action of animal charcoal and filtered while hot. These crystals are in the form of somewhat brilliant and hard tables of a yellowish colour and containing 4·8 per cent. of water of crystallization. The solution does not reduce Fehling's solution; it takes a dark green colour with ferric salts, and a tint that turns to a cherry red on the addition of sodic carbonate. The neutral and basic acetates of lead give a bright yellow precipitate, and nitrate of silver a whitish precipitate, which darkens and becomes reduced on being heated. It has a strong acid reaction and is coloured deep yellow by concentrated alkalies, the tint changing to brown in the air. The acid may be obtained fairly well crystallized from its solution in boiling acetic acid in the form of crusts consisting of opaque warts. It does not seem to possess a fixed fusing point, but towards 414° F. it decomposes, giving off gaseous products. Submitted to dry distillation it yields an oil that becomes crystalline on cooling. These crystals give the reactions of catechine, especially the characteristic green colour with caustic potash.

The above are the characteristics of caffeic acid as described by Hlasiwetz in Liebig's 'Annalen,' vol. cxlii. Hlasiwetz obtained his acid by splitting up caffeotannic acid. Analyses of both compounds are similar to each other within ordinary limits. The formula determined from the analytical results, as interpreted by Hlasiwetz, is—$C_9H_8O_4 + \frac{1}{2}H_2O$.

* From the *Annali di Chimica* for June.

In order to avoid any doubt on the matter the author prepared from the cuprea bark acid some bimethylcaffeic acid and its methylic ether, which both gave precisely the same characteristics as the corresponding compounds prepared from the caffeic acid of Hlasiwetz.

The fact of having produced caffeic acid from the *Cinchona cuprea* as a product of the splitting up of a complex substance contained in it, that acid only having hitherto been obtained by a similar splitting up of caffeotannic acid from coffee, furnishes an additional proof of the relationship which exists between the coffee and cinchonaceous plants, Zwenger having already obtained quinic acid from the former. With several extracts of other species of cinchona bark the author could not succeed in obtaining this acid.

AMMONIACAL CITRATES.*

BY E. LANDRIN.

It is well known that many metallic oxides and citrates, insoluble in water, are soluble in the alkaline citrates, even in the presence of reagents, which under ordinary conditions precipitate these oxides. This phenomenon has been made the basis of a quantitative method for the determination of phosphoric acid. Some years ago, Spiller (*Pharm. Journ.*, 1858) carried on a series of investigations, in order to study the influence of citric acid in preventing the precipitation of the metallic oxides, and arrived at the general result that the neutral citrates possess the property of combining with other salts to form a class of compounds of the general formula $M'_3C_6H_5O_7 + 3M'_2SO_4$, in which sulphuric acid may be replaced by carbonic, chromic, or boracic acids. For instance, solutions of these compounds are not precipitated by barium nitrate until a slight excess of sodium sulphate is present. Lebaigue (1864), however, considers that these phenomena are due to an interchange between the acids and bases, which is stable only so long as the citrate liberated in the nascent state is soluble, and thus the peculiar characteristics of the acids and bases present become apparent when the nascent citrate has saturated the alkaline citrate, viz., when the precipitant is in excess of the alkaline citrate. Further, the insoluble citrates are dissolved in the alkaline citrate in definite proportions, and citric acid being tribasic can saturate not only three equivalents of the same, but also of different bases to form soluble salts.

In order to decide between these views, the author has taken up the question, and has arrived at results in accordance with those of Lebaigue, *i.e.*, citrates insoluble in water dissolve in alkaline citrates, with formation of double salts of the composition $M_2M'C_6H_6O_7$, in which M is an alkali-metal, and M′ a metal belonging to some other class.

This result receives support from the following experiments:—If barium carbonate is gradually added to citric acid saturated with ammonia until one equivalent of acid and baryta are present, a clear solution is obtained, from which, on cooling, normal barium citrate separates out. The supernatant liquid contains in solution a double ammonium barium citrate. Analogous phenomena were observed with the oxides of calcium, strontium, lead and cadmium. Again, if aluminium hydroxide be dissolved in ammonium citrate, and the solution evaporated over sulphuric acid, white crystals of a double ammonium aluminium citrate, $3C_6H_5O_7(NH_4)_2H + [C_6H_5O_7(NH_4)_2]_3Al_2 + 6H_2O$, will separate out. A similar iron salt was obtained, a solution of which gives no precipitate with succinic and benzoic acids, no coloration with potassium thiocyanate, and no precipitate but only a green coloration with potassium ferrocyanide. The author also prepared and analysed analogous double citrates of ammonium and magnesium, manganese, nickel, cobalt, zinc, copper and mercury, but was unable to obtain salts of antimony, bismuth, tin or silver.

* From *Journ. Chem. Soc.*, June 1882; *Ann. Chim. Phys.*, [5], xxv., 233.

The Pharmaceutical Journal.

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THE "LANCET" ON DRUG ADULTERATION.

THE address delivered by Professor ATTFIELD before the British Pharmaceutical Conference at Southampton has furnished topics for editorial comments in most of our medical contemporaries. We doubt whether in all cases Professor ATTFIELD would be prepared to accept the construction put by the writers upon particular parts of his address, and certainly we think he must have been surprised to find himself ostentatiously thanked in the last number of the *Lancet* for giving the opportunity of writing one of the wildest productions upon the subject of adulterated medicines that has yet appeared in a journal claiming to speak with authority on medical subjects. The determining cause of the publication of such an article as that to which we refer is simply enigmatical to the uninitiated, but the consequences necessarily following such a course are such as to make it much to be deprecated. Amongst the good work done by the *Lancet* in the past that which is perhaps best known and remembered by the general public is the agitation it carried on against adulteration, which paved the way first for the Adulteration Acts of 1860 and 1872 and then for the existing Sale of Food and Drugs Act. Any statements made by our contemporary upon the subject of sophistication or substitution, especially in regard to medicines, with which it might be supposed to have special facilities for becoming acquainted, may well, therefore, be received as authoritative by a large portion of the community, though we are glad to believe that in this case they will not be so accepted by the members of the medical profession generally. The *Lancet* is, moreover, not entitled to the excuse—if it be one—that might be allowed to the *Saturday Review*, where the topic was started, that it was writing about an unfamiliar subject, since it deliberately joined in the discussion with the assumption that that journal was less perfectly acquainted with the facts.

The charge made by the *Lancet* is that death is often attributed to the virulence of disease, or perhaps to want of skill on the part of the doctor, when in reality it is attributable to the use of worthless medicines. "The doctor," it says, "ordered the "appropriate remedy, and if actually administered "it would probably have checked the course of "the disease. But what was actually administered "was not the remedy at all, but a counter-"feit of it, and though the patient did not "detect the difference, the disease did, and the "patient died." If language means anything this must be construed as applying to the conduct of pharmacists in the dispensing of the prescriptions of medical practitioners, and as involving a terrible allegation against the integrity of a class of men in whom, we believe rightly, the medical profession and the public at present repose considerable confidence. And with the exception of one piece of personal experience—the substitution of powdered sugar flavoured with quinine for salicin, which looks very much like an old story told backwards—the only evidence referred to in support of the charge is a report on the deteriorations, adulterations and substitutions of drugs presented to some public body in the United States.

The fact is that the whole article would be too grotesque for serious consideration were it not that a continued repetition of even irresponsible statements cannot fail to produce uneasiness and doubt where only confidence ought to exist. The time is past when men should be placed in a literary pillory without undergoing even the form of a trial. If there be offenders among British pharmacists, such as those described by the *Lancet*, a means has now been provided by Parliament for bringing them to punishment, and the evidence that ought to be considered indispensable before publishing such gross imputations would be sufficient for their convictions. But the absence of such convictions, although the law has now been in operation seven years, during which time the officers acting under its provisions have certainly shown no lack of attention to drugs and medicines, is sufficient to show how little justification there is for the statement above quoted. That drugs of inferior quality and adulterated drugs are still to be met with is not to be denied, but between them and the patient stands the skilled pharmacist who has been specially trained to detect and eliminate such disturbing influences in the battle against disease, and we do not believe the dispensing of the pharmacists of this country is fairly open to reproach. It may be that picked cotton is sometimes introduced into bottles of quinine to increase the bulk, as indeed the *Lancet* says it is; but we presume that our contemporary is hardly prepared to contend that such quinine, cotton and all, finds its way into mixtures upon which the lives of patients depend, or even into less critical preparations.

THE INTERNATIONAL PHARMACOPŒIA.

THE opportunity afforded by the recent meeting of the German Pharmaceutical Association was utilized by the President of the International Pharmacopœia Commission, Herr VON WALDHEIM, to present a statement as to the progress made in carrying out the work confided to that body by the Inter-

national Pharmaceutical Congress held last year in London. Herr von Waldheim said that the Commission now consists of thirty-two members, two of which represent the United States and the remainder European countries. Only one European state, Spain, remains unrepresented, repeated applications, both oral and by letter, having been made to the Madrid Pharmaceutical Society to elect representatives, without effect. The first step taken by the President of the Commission was to send to each member a list of medicinal substances and preparations occurring in the European and American pharmacopœias, with the request that the recipient would strike out all those articles which he did not think suitable to be included in the International Pharmacopœia, and also add to the list any omitted articles that he thought should be included. From nearly all the members the revised lists have been received, Norway, Italy, and, of course, Spain, being the only defaulters in this respect, the lists being accompanied in many cases with the revisors' reasons for the course taken and as a rule presenting evidence of the most careful consideration. The list sent for revision contained 233 of the most used more or less powerful medicinal substances and preparations, and about 350 other drugs and preparations were recommended by the different members as suitable to be included in an International Pharmacopœia, the French representatives making in addition the general declaration that they were in favour of the largest possible list.

Although at the first glance it would seem difficult to determine among so large a number as 583 articles what were suitable for insertion and what were not, the problem was made considerably easier by, on the one hand, keeping in view the resolutions passed by the Congresses of Paris, Vienna, and especially of London, and on the other, the consideration that the fitness of any particular medicament, however powerful it might be, for a place in the International Pharmacopœia must be dependent upon the extent to which it is known and used. As a result it would appear that altogether 120 or at the most 150 articles should be included in the work, since most of the representatives were in favour of only the most powerful medicines being included, striking out the less active, whilst scarcely any of the 350 articles proposed in addition were recommended by more than one member.

The next step taken by the Executive will be to draw up a list of articles proposed to be included, based upon the revised lists and recommendations, together with formulæ for the preparations, and send a copy to each of the members of the Commission for consideration. The plan proposed to be followed in respect to the formulæ is to compare the recipes for each preparation occurring in the different pharmacopœias, and to recommend those for acceptance which are found in the majority of the pharmacopœias of the larger states, giving especial weight to those in the more recent works; consequently, there can be little doubt that the new edition of the German Pharmacopœia will exercise an important influence in this respect. Among the most difficult points to settle appear to be the materials for and the manner of preparation of extracts and the relative proportions of the original drug to many tinctures and preparations, concerning which the greatest divergence exists in the pharmacopœias of different countries. Herr von Waldheim is of opinion that in the case of countries where existing formulæ differ very widely from the new ones that may be adopted in the International Pharmacopœia, consideration should be shown for what will frequently be a very old custom, and that this could be best done by such old formulæ being retained in the respective countries under names quite different from those adopted in that work, and then indicating such preparations when intended by mentioning the pharmacopœias of their respective countries. With respect to simple substances it is proposed to give only the most important characters and to avoid as much as possible giving tests for chemicals, leaving these definitions to be supplied in the pharmacopœias of the different countries.

MENTAL MIST.

Our United States contemporary, the *Therapeutic Gazette*, assuming that a paper on "Secret Remedies," which appeared in the *Pharmaceutical Journal* for December 17 last (p. 502), was an expression of our editorial opinion, is pleased to express its approval of our aim, but is fearful that there is a mist in front of our mental vision that needs clearing up before we shall be able to see the difference between scientific pharmacy and the unscientific pharmacy of some specialties; to this friendly task, therefore, it devotes the greater part of two columns. Our contemporary is well qualified to speak with authority upon the subject of specialties, but it appears to be labouring under a mistake, which, as its remarks have been quoted by the *Pharmacist* and possibly by other journals, it will be as well to correct. We would therefore disclaim any right to the limited praise or any necessity for the volunteered coaching with respect to the article in question, since the only mist which has interposed has been that which came between our contemporary's own vision and the statement contained in the opening sentences, that the article was a quotation from a German journal.

At the recent meeting of the German Pharmaceutical Association in Berlin, it was announced that during the past year 114 names had been removed from the roll of members and 135 added, being a net increase of 21. The gross total of members of the Association is now 2755, which includes 17 extraordinary and 18 honorary members.

According to a recent Government return, the crop of cinchona bark derived from the Government plantations in the island of Java amounted in 1881 to 165,000 Amsterdam pounds (nearly 180,000 lbs. avoirdupois) against 100,000 pounds in the previous year.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 238.)

A paper was then read on—

The Purity of Commercial Chloride of Gold.

BY F. W. BRANSON.

In the Blue List issued annually to members of the British Pharmaceutical Conference, "The Purity of Commercial Salts of Gold" has, for several years past, appeared as a desirable subject for investigation; the contribution of the results of a series of recent analyses of chloride of gold may therefore prove of interest, especially as most pharmacists have at least occasional transactions in this article of commerce.

A standard of strength and the maintenance of this standard is by no means a matter of indifference, considering the large quantity used by photographers in the process of toning. As most of the salt met with in commerce is found in 15-grain tubes, ten of these from five distinct sources were taken for analysis, low results being obtained from Nos. 9 and 10; two other tubes from the same source were taken to prove whether the deficiency was an average one or due to careless weighing or loss in filling.

In the above series, owing to the distinctive appearance of the various samples, labels, etc., the products of four manufacturers could be recognized, series *A*, *B*, *C* and *D*.

After several experiments the following methods for the estimation of the weight of contents of tube and the contained gold were found to be convenient, rapid (if the time required for precipitation, thirty-six hours, be excepted) and accurate, the precipitated gold being nearly chemically pure.

The vol. process with oxalic acid and permanganate, as described by Sutton, was not tried, the direct method being considered preferable.

The actual weight of the contents of each tube was estimated as follows:—After removal of label by soaking in water the tube was filed round the centre to facilitate breakage; the weight of tube with contents was next taken, the salt shaken to one end of the tube and fracture made at filed portion; the two portions of tube with contents were now transferred to a beaker, and treated with successive quantities of distilled water; the resulting solution, after transference to a conical flask having a file mark at 5-oz. capacity (which measure the solution should occupy) was precipitated with oxalic acid.

The weight of fractured tube after drying was deducted from the weight of tube with contents, the difference being chloride of gold.

The annexed series shows the weight found in each tube, the average of each manufacturer is also given—

Sources.		
A .	14·781 14·180 14·875 15·995	average 14·957.
B .	15·620 14·673	average 15·146.
C .	14·627 15·470	average 15·058.
D .	13·547 13·948 13·825 13·677	average 13·749.

The best precipitant was found to be pure oxalic acid, several advantages being apparent; for, as the precipitation proceeds at a much slower rate than with either sulphurous acid or ferrous sulphate, should platinum or other metals be present they are less likely to be carried down with the gold; the metal is also thrown out of solution in a more coherent form, thus facilitating the subsequent operations. The non-introduction of a metallic salt is also obviously an advantage if the separation of metals is found requisite.

Experiments proved the time required for complete precipitation to be not less than thirty-six hours at a temperature of about 70° F., and twelve hours' exposure to light.

The quantity of oxalic acid found to give good results was 25 c.c. of the standard solution (63 in 1000) for the contents of each tube; this quantity was therefore measured by means of a pipette into the gold solution, the flask set aside under conditions as above described, and the contents finally raised to boiling point; after subsidence the colourless solution was found in a trial experiment to be not darkened by H_2S, and on evaporation no further reduction of metal occurred, the residue, oxalic acid, being quite white.

After precipitation the greater part of the fluid was poured on a filter, the flask was then shaken in a circular manner so as to cause the particles of gold to sweep off any film adherent to the sides of flask, which should now appear by reflected light to be quite free from metallic coating, the precipitated metal collected on the filter, washed, dried, incinerated and weighed, the following results being obtained:—

A .	7·267 6·974 7·313 7·792	average 7·286.
B .	7·349 7·082	average 7·215.
C .	7·097 7·537	average 7·317.
D .	6·595 6·773 6·661 6·588	average 6·654.

Sufficient time not being at my disposal for the complete examination of the residues from the evaporation and incineration of the oxalic acid solution from which the gold had been precipitated, they were placed aside for subsequent analysis. I will now, therefore, merely give in round numbers the weights yielded by series *A*, *B*, *C* and *D*.

A and *B* more than 10 per cent.
C and *D* less than 1 „

Metals precipitated by H_2S or AmHS were practically absent from all the above samples, which were obtained from firms most likely to supply the requirements of pharmacists, foreign samples being purposely excluded.

A small variation *plus* or *minus* within reasonable limits in the quantity of salt or metal contained by any given tube is, of course, allowable, and is to be expected, but the marked deficiency of tubes Nos. 9 to 12, inclusive, obtained from a firm possessing the confidence of the trade demands notice, for a deficiency of 8 per cent. in weight of contents or 5 per cent. in the proportion of metal that should be present demands notice, and it should be mentioned that neither trade mark, seller's name nor guarantee label was attached to either of these numbers; but tubes Nos. 1 to 8 all had attached one or other of these distinctive marks, and from sources *A* and *B* 7 grains of gold was guaranteed, which quantity was fully present, as proved by analysis.

In a paper by my friend, Mr. Richard Reynolds (*vide Pharm. Journ.*, [2], vol ii.), greater discrepancies than the above were detailed, and the proposal was then made that the commercial value of the article should be governed by the equivalent of gold present; now, as then, this desirable practice would, if generally followed, certainly tend in favour of the interest of the consumer, and probably for this very reason is not adopted by some manufacturers.

The President proposed a vote of thanks to Mr. Branson, which was carried.

Mr. Hampson asked if it would be any advantage to have the solution sold by measure.

Mr. Branson said there was the question of convenience of transport involved, as the tubes were frequently sent by post, but there was no reason why a strong solution of definite strength should not be sent out in capsules.

This was followed by a paper on—

The Iodides of Bismuth.

BY F. W. FLETCHER, F.C.S., AND H. P. COOPER, F.C.S.

The iodides of bismuth described in the text-books are two, viz., a black tri-iodide (BiI_3) and a red oxy-iodide (BiOI).

To obtain the former, one equivalent of tri-sulphide of bismuth is directed to be heated with three equivalents of iodine in a capacious loosely-covered glass globe. The iodine turns out the sulphur, and the new compound is deposited on the sides of the vessel in the form of brilliant plates. This is Schneider's process. Another method, suggested by Weber, consists in throwing iodine into melted bismuth, and distilling the mixture out of contact with air.

The red oxysalt (BiOI) is said to be formed on heating the tri-iodide for some time in a crucible, when it collects below the surface of the crystallized iodide in a mass of copper-coloured rhombic laminæ.

Both of these compounds, however, may be much more conveniently obtained by the decomposition, under certain conditions, of a solution of a bismuth salt by means of a soluble iodide.

Mr. Pattison Muir, to whom, with his coadjutors, chemists are immensely indebted for researches upon bismuth compounds, has recently described a very striking method of exhibiting the formation of the two iodides by pouring a solution of the tri-iodide of bismuth in hydriodic acid into varying quantities of water at different temperatures. On adding the hydriodic acid solution of BiI_3 to a little cold water, the black tri-iodide is thrown down; whilst if a large bulk of hot water is employed, red crystalline BiOI is produced.

We have lately met with a yellow iodide of bismuth, which, partly on account of its novelty, and largely on account of its bearing upon one of the Pharmacopœia tests for the purity of bismuth salts, we considered would be of sufficient interest to bring before the Conference.

In the course of testing a number of samples of metallic bismuth for lead, by the addition of dilute sulphuric acid to the solution of the metal in nitric acid, we observed in one instance that a very considerable deposit was formed after standing for about twenty-four hours. As this appeared to indicate the presence of a very much larger proportion of lead than we had previously met with, the precipitate was collected upon a filter, washed, and treated with solution of ammonium acetate, in which it dissolved. Upon the addition of potassium iodide to the liquid, a bright yellow precipitate was thrown down, having all the appearance of lead iodide.

A duplicate experiment being made, we found to our surprise that no precipitate was in this instance formed, when the solution of bismuth was treated with sulphuric acid; and the subsequent application of Chapuis and Lennoissier's potassium chromate test* conclusively proved the absence of lead in the sample of bismuth.

It occurred to us, on reflection, that the precipitate produced by sulphuric acid was probably a very basic sulphate of bismuth, produced owing to the bismuth solution being too concentrated. Experiment verified this assumption, and it may not be out of place here to mention that we find that if subnitrate or carbonate of bismuth,—free from lead,—be dissolved to saturation in nitric acid, diluted with half its volume of distilled water, as directed in the Pharmacopœia, and an equal bulk of dilute sulphuric acid then added, a precipitate of basic sulphate of bismuth is formed on standing, which, so far as the Pharmacopœia test goes, might reasonably be mistaken for sulphate of lead.

The solubility of freshly precipitated basic, or rather sesquibasic, sulphate of bismuth in ammonium acetate solution, has not, we believe, been previously noted, and it was therefore quite accidentally that we discovered the yellow iodide, which is the occasion of the present paper.

It naturally occurred to us that the yellow precipitate might not be an iodide of bismuth only, but a double iodide of bismuth and potassium. To ascertain this, a portion was treated with nitric acid and excess of ammonia. The filtered liquid evaporated to dryness left no residue on ignition.

The absence of potassium was therefore demonstrated.

We were now anxious to ascertain by what other methods the new compound could be obtained.

Being aware that Drs. Woodman and Tidy had some years since, in the *British Medical Journal*,* described the formation of a red precipitate in a mixture containing iodide of potassium and subnitrate of bismuth, and also that M. Jaillet had prepared various yellow compounds under somewhat similar conditions,† we proceeded to treat various samples of subnitrate of bismuth with iodide of potassium, and found that the products obtained varied in colour from a pale lemon-yellow to a deep orange-red. Knowing that subnitrate of bismuth varies considerably in its percentage of nitric acid, we inferred that in the absence of the latter the yellow salt would be alone produced. The samples of subnitrate were therefore first shaken with solution of ammonium or sodium acetate, in order that acetic might take the place of any free nitric acid that might be developed. The addition of KI to these mixtures formed the yellow iodide only, as we anticipated.

We found also that the iodide could be readily prepared by pouring a very dilute solution of nitrate of bismuth into mixed solutions of potassium iodide and sodium acetate. Liq. bismuthi, B.P., whether neutral or acid, gives no precipitate with potassium iodide, but an orange solution is formed. This, in fact, is the method recommended by Thresh, for preparing Dragendorff's reagent. If, however, scales of citrate of bismuth and ammonia are dissolved in water and the solution acidified with acetic acid a copious orange-yellow precipitate is formed on the addition of potassium iodide.

Yellow iodide of bismuth is sparingly soluble in acetic, and freely in hydrochloric acid. Sulphuric and nitric acids liberate iodine. Digested with zinc and dilute sulphuric acid, the bismuth is deposited as metal, and the iodine passes into solution as iodide of zinc.

It is not decomposed by water, even at a boiling temperature. Ignited in a porcelain crucible it first blackens, and then evolves iodine, leaving a residue of bismuthous oxide, which, however, obstinately retains traces of iodine, which are only expelled after prolonged heating.

We have made a large number of analyses of different samples prepared by various methods, and we find that the relative proportions of bismuth and iodine vary with the colour of the compound, those which are yellow containing more bismuth and less iodine than those which are orange or orange-red.

Analyses of several specimens of a fine lemon-yellow colour, prepared by treating equal weights of subnitrate of bismuth with similar quantities of sodium acetate and potassium iodide, gave concordant results. The bismuth was estimated by the two following methods and the results given represent the mean of several experiments.

1. By ignition, the precaution being taken to moisten the residue with nitric acid, and again ignite before weighing. Bi_2O_3 found = 86·6 per cent.

2. By solution in dilute nitric acid and precipitation with ammonia. The precipitate washed until free from

* *Journ. Chem. Soc.*, xxxvi., 80.

* See *Pharm. Journ.*, [3], i., 464.

† *Pharm. Journ.*, [3], vol. xi., 1063.

any trace of iodide, yielded on ignition 86·8 per cent. Bi_2O_3.

The iodine was also estimated by two methods:—

1. The compound was heated with solution of pure sodium hydrate, the precipitated bismuth hydrate thoroughly washed, the filtrate and washings acidified by nitric acid, and the iodine precipitated as a silver salt. The amount found was 11·35 per cent. A trace of iodine was, however, discoverable in the precipitated bismuth, even after prolonged washing.

2. Known weights of bismuth subnitrate and potassium iodide were agitated with water in the presence of sodium acetate, and the yellow iodide obtained filtered off, washed, dried and weighed. The filtrate and washings were then diluted to a certain volume and the iodine estimated by volumetric solution of silver nitrate. It was found that 12·8 per cent. had been absorbed in the formation of the yellow compound.

An attempt was made to separate the iodine in the form of HI by decomposing the iodide by a current of H_2S, but this was not successful, the resulting black precipitate being found to contain iodine in abundance.

The results obtained tend to show that the yellow compound is a very basic iodide of bismuth, represented by the formula—

$$BiI_3,\ 5B_2O_3 \text{ or } 3BiOI,\ 4B_2O_3.$$

This formula requires 12·9 per cent. of iodine and 87·7 per cent. of B_2O_3. The amount of the latter found by experiment was 86·7 per cent., and the iodine (calculated by difference) 12·8 per cent.

The formula of the tri-iodide of bismuth being BiI_3 and that of the oxy-iodide or bismuthyl iodide (BiOI), the latter may be regarded as formed from 1 molecule of BiI_3 and 1 molecule B_2O_3, thus—

$$BiI_3 + B_2O_3 = 3BiOI.$$

Between the latter and the yellow salt which we have described, it is probable that there may be many intermediate compounds, a supposition confirmed by the fact that iodides of various shades of colour, from pale yellow to deep orange-red, are easily obtainable by altering the relative proportions of the iodine and bismuth. A striking experiment illustrating the tendency of the tri-iodide to form oxygen compounds may be shown by dropping a few grains of BiI_3, or a few drops of the solution of the latter in hydriodic acid, into a large bulk of water, the latter at the same time being vigorously shaken. The brownish-black colour of the tri-iodide is seen to give place to a white turbitity, and on the careful addition of a little more of the powder or solution the formation of the yellow iodide is at once apparent.

The President, in proposing a vote of thanks to the authors of the paper, said it was one of considerable theoretical as well as practical value.

Professor Tichborne asked if Mr. Fletcher found the temperature at which the salt was precipitated affected its composition, as temperature was known to have a great influence on basic salts generally.

Mr. Fletcher said the temperature seemed to have no action at all. The salt was not soluble in either cold or boiling water; this would instantly distinguish it from iodide of lead.

Mr. Plowman then read the following:—

Note on Microscopic Organisms in Certain Organic Solutions.

by C. H. Bothamley, F.C.S.,

Assistant Lecturer on Chemistry at the Yorkshire College.

The growth of algæ and fungi in solutions of organic substances, as for example, in solutions of tartaric acid or potassium acetate, is a matter of common observation. A number of such forms were described and figured by Pereira many years ago (*Pharm. Journ.*, vii., pp. 337, 370, 426, 1847–48). Not only do they grow in purely organic solutions, but also in organic solutions containing a considerable proportion of metallic salts. Kützing observed the formation of such growths in solutions of "polychrome" (æsculin) mixed respectively with ferric chloride, cupric sulphate, tartar emetic, gold chloride and stannous chloride. Several of the forms which grow under these conditions are described by Percira (*loc. cit.*), who also states that he had himself observed the growth of a filamentous plant in a solution which was used for the preservation of animal substances, and which contained mercuric chloride. The exact nature of the growth depends on the particular metallic salt present, each salt being favourable to the development of a particular species. In the same paper, Pereira states that he had observed the formation of similar growths in a solution of phosphoric acid prepared by oxidizing phosphorus with nitric acid, and also in a solution of arsenious acid! It is well known, too, that a very singular fungus grows in the cells of Daniell's battery, if allowed to remain unused and at rest for a long time. With these exceptions, however, the formation of such growths in inorganic solutions appears to be comparatively rare.

In the College laboratory we are troubled with the continual formation of a green vegetable growth in bottles containing respectively solutions of ordinary sodium phosphate, magnesium sulphate, and calcium sulphate, though no such growths are formed in solutions of ammonium salts, barium chloride, and other reagents standing on the same shelves. It was natural to suppose that the germs of these organisms are derived from the air, but their appearance only in the three reagents mentioned, and not in any of the others, although some of the latter seemed to constitute more favourable media, led to the supposition that the germs were possibly mixed with the particular salts. Experiments were therefore made to determine this point.

Ten per cent. solutions of magnesium sulphate and sodium phosphate respectively were prepared by dissolving the salt in cold recently distilled water, and portions of these solutions were placed in small flasks, as follows:—

A. Original solution, left exposed to air.

B. Solution boiled five minutes, then left exposed.

C. Solution boiled five minutes and flask plugged with cotton-wool.

D. Solution heated at 55°–60° C. for two hours, then plugged.

E. Solution heated at 70°–75° C. for two hours, then plugged.

For some time no growths made their appearance in any of the flasks, but soon after the air of the balance room in which the flasks were placed had been rendered dusty, in consequence of sweeping, the vegetable growth began to form in the exposed flasks *A* and *B*, and gradually increased. In one of the *B* flasks, containing magnesium sulphate, there was also a greyish flocculent growth. No growth appeared in any of the plugged flasks, even after fifteen months. It is evident, therefore, that the germs of this vegetable organism are derived from the air.

When examined with a good sixth or eighth inch objective the green growth is seen to consist of approximately spherical bodies of very simple structure. They consist of a cell-well, enclosing a green fluid, in which are a few patches of minute reddish granules. In general appearance they resemble *protococcus*, but are much smaller, and belong to that somewhat indeterminate group of bodies which are classed together as *crococcus*. My own observations in this respect are confirmed by those of several biological friends. A small quantity of the growth formed in sodium phosphate, when transferred to a clear solution of magnesium sulphate, multiplies and flourishes just as vigorously as in the original liquid, and *vice versâ*.

Both solutions no doubt contained small quantities of ammonia, and the sodium phosphate contained some sulphate. The amount of phosphoric acid in the magne-

sium sulphate solution was, however, not sufficient to give a reaction with ammonium molybdate. The magnesium sulphate is, however, prepared from dolomite, which almost invariably contains small quantities of phosphoric acid, hence it is probable that we have here further proof that the formation of these green vegetable growths constitutes a most delicate test for phosphoric acid.

A vote of thanks was accorded to Mr. Bothamley.

The PRESIDENT, in putting it, said he gathered from the concluding paragraphs of the paper that Mr. Bothamley was going on with the subject, and if so he would no doubt tell them in due time what would happen if they put phosphoric acid or a phosphate of potassium, etc., into the solutions in which he had not yet observed any growth.

Mr. PRESTON said he should like to know whether Mr. Bothamley had had under consideration Fehling's solution, which was so very difficult to keep. Very often, when it would act while freshly made, after being kept a little time it would become of little or no value. Perhaps the cause of that might be traced to the presence of these vegetable organisms. He had found when in preparing that solution great care is taken to scald out the vessels, and to use other necessary precautions, the solution kept almost an indefinite period.

Mr. PARKER asked if it were not possible that the growth of fungi might be due to the absorption of ammoniacal salts from the air, such being frequently present in the atmosphere of a pharmacy or laboratory.

Mr. GREENISH said the Conference was indebted to Mr. Bothamley for bringing this subject forward; the changes which took place in pharmaceutical preparations had not received as much attention as they deserved. It was found, for instance in vin. ipecac., that a change was constantly going on in the bottle, and if they examined it by the microscope they found fermentation active, cells being distinctly visible. Again, if they took orange flower water they found a yellow deposit, and on examining it under the microscope it would be found full of bacterian life. It was also of great importance to pharmacists that these fungoid growths which appeared in solutions, even made according to the Pharmacopœia, should be studied; but it was found by many dispensing chemists very desirable and almost necessary to keep solutions of a great many salts, and he found that in nearly every one of them there would be more or less of fungoid growth, which caused great annoyance. It was not confined to any one solution, but he scarcely knew of one in which it did not apppear. He had himself cultivated a fungus grown in a solution of arsenic, a very interesting fungus; and he had cultivated another in a solution of strychnine, which was also very interesting. But it was well known to fungologists that the particular fungus could not be determined from the vegetative process or the mycelium; it must proceed to fructification. Now the fructification of a fungus in a solution would not take place so long as there was any portion of the material which afforded the fungus nourishment in the solution, and what made this matter of great importance was that if the fungus was allowed to continue to vegetate and increase its mycelium in a solution which might contain a certain amount of strychnia, or anything else, a portion or the entire of the active principle or medicinal property would disappear; therefore, it was highly desirable that this matter should be thoroughly investigated, and he sincerely hoped that Mr. Bothamley would continue these inquiries, and in continuing them that he would not be satisfied in examining merely the mycelium which was found in the solution, but would take out the fungus, place it in distilled water, wash it, remove the nutriment on which it fed, and then endeavour if possible to promote its fructification. That could only take place on the surface if it were a fungus; if it were an alga it would of course take place under the solution. As these things appear in almost every aqueous solution used by dispensing chemists it was imperative that attention should be paid to them.

Dr. SYMES said he did not think that the presence of fungoid growth was in itself evidence of the presence of phosphoric acid, but he thought Mr. Parker's suggestion of ammonia assisting in its development would hardly hold good, because the flasks were simply plugged with cotton wool, placed side by side with those not plugged, the contraction and expansion of the air going on freely, and he assumed the ammonia would enter the flasks, and if ammonia had anything to do with the development, the growth would be found in them all.

Mr. PARKER remarked that although ammonia might get into vessels which were plugged by cotton wool the germs would be kept out.

Mr. EKIN said he might mention one instance where neither ammonia nor phosphoric acid had anything to do with a growth of this sort. It occurred in an experiment with one of the azo-colours in which the principal ingredients were amidoazobenzol and β-naphthol. The precipitated colour became a solid gelatinous mass from fungoid growth in the space of twenty-four hours. It certainly startled him, and he had never been able to get any explanation of it.

Mr. GREENISH said Mr. Bothamley spoke of the germs being in the atmosphere and of the fungi appearing in some solutions and not in others. Now the fungi were different in the solutions of arsenic and in the solutions of strychnia. Fungi would grow where there was a nidus suitable for them, one in one material and a different one in another.

The Conference then adjourned for luncheon.

The next paper read was on—

THE SOLUBILITY OF MORPHIA SALTS.

BY D. B. DOTT, F.R.S.E.

Early last year I read a short paper on the solubility of some of the salts of morphia, a report of which was printed in the *Pharmaceutical Journal* of January 29, 1881. Since that time two communications on the above subject have appeared in the same Journal, both originally proceeding from the other side of the Atlantic. The first is a paper* by Professor Frederick Power on "The Solubility of Sulphate of Morphine," and the second is by Mr. J. U. Lloyd on the "Solubility of the Officinal Morphia Salts in Water and Alcohol."† Neither of these experimenters has thought fit to take any notice of my paper, nor would I of theirs, if they merely confirmed or superseded mine. As, however, I consider both of them to be very much open to criticism, I should like to take this opportunity of pointing out what I believe to be their errors.

No exception can be taken to the method employed by Professor Power in determining the solubility of the sulphate, although it is not a process applicable to all salts. It consists simply in estimating the sulphuric acid as sulphate of barium and from that calculating the corresponding amount of sulphate of morphia. Professor Power also determined the solubility by evaporating to dryness a weighed portion of the saturated solution. The ratio given by the two methods, which ought to have yielded identical results, presents a difference of about 2·5 per cent.—a somewhat serious discrepancy. The former method is the one relied on, and Dr. Power concludes that "1 part of sulphate of morphia requires in round numbers 24 parts of water at 15° C. (59° F.) for solution." This result, however, is arrived at by dividing the *weight of the solution* by the weight of the salt dissolved therein. Now it is manifest that in order to ascertain the amount of water holding a salt in solution we must deduct the weight of the salt from the weight of the solution. The solubility is then obtained by dividing

* *Pharm. Journ.*, [3], 798.
† *Ibid.*, 1036.

the weight of the solvent by the weight of the salt. Thus treated Professor Power's numbers give for the solubility of morphia sulphate in water at 15° C. 1 in 22·99, by the precipitation method, and 1 in 20·44 by the evaporation method. The Professor speaks of "disregarding the slight increase of volume produced by solution;" yet I cannot see what increase of volume has to do with the matter.

Turning to Mr. Lloyd's paper I find that his method of determining the solubility of salts in the cold is by evaporating a weighed portion of the saturated solution, which is the plan I have always adopted. Mr. Lloyd allows the solution to evaporate spontaneously, weighing the residue with its water of crystallization. This, of course, is of no consequence if care be taken that the crystals have not effloresced. Referring to the residue remaining from an alcoholic solution, Mr. Lloyd remarks: "The alcohol may abstract more or less water of crystallization, and fail to take its place in like amount, if at all, thus leading us into a slight error." I am not aware of a single instance of alcohol combining with an alkaloidal salt, and all the well-known morphia salts separate from 85 per cent. alcohol with the same proportion of water of crystallization as when crystallized from water. I regard Mr. Lloyd's system of boiling a known weight of water in a retort and gradually introducing the salt through the tubulure as an elaborately erroneous method of ascertaining the solubility of the salt in the boiling menstruum. For ordinary determinations the flask containing the boiling solution may be tilted so as to pour some of the liquid into a capsule, which is immediately covered, and weighed when cool; while for more accurate estimations a small vessel fitted with a cover may be let down into the boiling solution. The solubilities given for the hydrochloride and sulphate are evidently nearly correct, but that of the acetate is certainly wrong. I am quite aware that there is some difficulty in ascertaining exactly the solubility of the acetate. This arises from the readiness with which that salt loses its acid, and also from the fact that a proportion of the free morphia is dissolved when the basic salt is brought in contact with water. Mr. Lloyd's ratio of 1 part acetate to 11·7 parts water is far wide of the mark, as the true solubility is not far removed from 1 in 2, which are the numbers given in my paper formerly referred to. When a saturated solution of morphia acetate is boiled, decomposition takes place and a certain amount of morphia is deposited. No doubt if a sufficient quantity of acetic acid be then added a clear solution is obtained, but it would hardly be safe to take the result of such an experiment as indicating the true solubility of acetate of morphia in boiling water; yet this is Mr. Lloyd's process. All the morphia salts, so far as I am aware, are less soluble in alcohol than in water, but the statement that "acetate of morphine is not so soluble in alcohol as the alkaloid morphine" is quite erroneous, the converse being correct.

I intended to have ready for this Conference a carefully compiled table of the solubility of morphia salts, but various circumstances have conspired to prevent me, especially the warm weather, as I wished to make all the determinations at 60° F. I trust, however, that what I have written will help to clear the ground for future work. Meanwhile the table which I formerly gave, and which is printed in the 'Year-Book of Pharmacy' for 1881, will be found "sufficiently correct for practical purposes."

The President, in proposing a vote of thanks to Mr. Dott, regretted that he was not present, and also Professor Power. Considering the difficulty of getting at the solubility of any salt or substance in fluids, and indeed the general indefiniteness and haziness of the matter altogether, he was not sure but that Professor Power was right in disregarding the slight increase of volume which was produced when a salt was added to water; at all events, in the cases mentioned. At the same time investigators were not quite so accurate as they might be in describing what they meant by solubility. It was common to see the solubility of a given salt stated to be 1 in 10, but one did not know whether that was 1 part by weight in 10 volumes, or that 1 part had been put into 10 parts of the fluid, or whether 10 parts by weight of the fluid contained 1 part of the solid.

Mr. Parker said he had been looking forward with considerable pleasure to this paper, and was very disappointed at Mr. Dott's absence. The subject of solubility was somewhat unsatisfactory; he would suggest that there should be standard conditions for the taking of solubilities, recognized through all countries. It was a disputed point as to its variability, but as far as his own work went he was satisfied that solubility might vary very much with the conditions under which it was observed. The solubility of a body of definite chemical constitution which was not altered in composition by the action of heat might be very well taken by the method of evaporation, but there were many bodies, volatile at a moderate dry heat, which could not be taken in that way; the solubility of the substance which he had the honour of bringing before the Conference on the previous day illustrated this fact. The chief point he had noticed was that when the substance was added to the cold menstruum, and the "point of saturation" observed, the result differed from that obtained by making a stronger solution with the aid of heat, and noting the "point of crystallization." In the case of terpin hydrate the solubility in cold alcohol was 1 in 13, whereas, taken in the hot way, it would be 1 in 11, so that either statement would be altogether useless unless the conditions under which the solubility was observed were mentioned. It would be very valuable to have throughout the whole range of chemical solubilities one standard by which they should be taken. Of course there would be some cases in which it might be taken more satisfactorily by another method, but these should be mentioned as exceptions to the general rule. The point of cold saturation appeared of most value to the pharmacist.

Mr. Williams thought this question of solubility had really a wider bearing than had perhaps been indicated either by the author of the paper or by the last speaker. The solubility of bodies seemed to be very intimately connected with their power of crystallization, and with that which arrested crystallization. He might remind the Conference of a paper which appeared in the *Pharmaceutical Journal* a few weeks before, by M. Tanret, in which he proved that caffein, which was extremely insoluble, was rendered soluble by salicylate, benzoate, or cinnamate of sodium. He had made some of the salicylic and some of the benzoic compounds, and they certainly were not chemical compounds, for chloroform dissolved the caffein from them; therefore, the caffein was merely held in them in a chemical form, or in a solution, but they could be converted into dry substances. These bodies, however, caused caffein to be perfectly soluble. This would upset, therefore, any attempted standard of solubility in a most important manner, and he believed caffein was not the only substance in which the same thing was illustrated. He would refer to salicylic acid and many of the alkaloids, which were really uncrystallizable until they got rid of the impurity, often in a very minute quantity, which entirely prevented their crystallization. That was very often represented by what was called solubility. He was very much of opinion that solubility should be taken rather as the measure of the want of power of crystallization than as simply the power of solution. Sulphate of lead, for instance, was a very insoluble body, absolutely insoluble probably in pure water, but it was known how terribly soluble it was in some solutions, such as sugar, acetate of sodium and some other bodies. For these reasons it seemed almost impossible to make a standard.

Mr. SHENSTONE said that already there was one practice which predominated in the statement of solubilities. He had lately been engaged a great deal on this question, and in looking through other people's work he found a large number of the old investigators gave their solubilities as the amount of salt dissolved by 100 parts of water, and those who made experiments of this kind would save a great deal of trouble by adopting that as their standard. If it became the practice of everybody working in this line to adopt that method it would simplify matters for the future, for if all adopted different standards it was very inconvenient. With regard to Mr. Williams's remarks, he did not think the case he alluded to, *i.e.*, the solubility of caffein in salicylate of sodium, was necessarily not a case of chemical action, because of the possibility of extracting the caffein from that solution by chloroform. It was possible that when caffein came into the presence of the sodium salicylate chemical action took place, a certain amount of salicylate of caffein being formed, and a certain amount of sodium hydrate set free in the solution. If the solution were now treated with chloroform, the result would be that the free caffein which remained there would be removed, and then the equilibrium being upset a reverse action would take place, some of the caffein being set free, which the chloroform would then remove, and this would be repeated, so that practically it might all be got out again.

Mr. P. W. SQUIRE said the value of solubilities depended very much on the object in view. For example, if a person wanted to dissolve a salt in water and had no notion about how much it would dissolve, the information he required was how much salt would dissolve in a given quantity of water. If, on the other hand, a manufacturer had a liquor which he wished to crystallize out, he viewed it from the point of how low it ought to go before the substance ought to crystallize out, and therefore he looked at the question from a totally different point of view from the other man. The salt would not crystallize out until it was supersaturated. It occurred to him, therefore, it was something like the case of 32° F. being looked upon as either the freezing point of water or the melting point of ice. It was rather the melting point of ice. He should call solubility the amount which would be dissolved in water, and the other point when it would crystallize after evaporation the point of crystallization rather than solubility.

A paper was then read entitled—

NOTES ON THE PHARMACY OF CINCHONA.

BY R. W. GILES.

It may be taken for granted that the members of the Pharmaceutical Conference are perfectly well aware of the contradictory and unsatisfactory state of the pharmacy of cinchona, for there has scarcely been a meeting at which it has not been pressed upon their notice, so that they may possibly ask "What is the use of this wearisome iteration?" The answer is that the grievance remains, and custom and prejudice are so inveterate that it is necessary to attack it again and again, even with the same weapons, before amendment can be hoped for. In this way alone pharmacists are able to exercise some influence upon their own Pharmacopœia.

All practical pharmacists must be aware that it is next to impossible to obtain officially recognized cinchona bark of the official alkaloidal standard; while there is no lack of barks of superior alkaloidal value and equally well adapted to pharmaceutical purposes which are not officially recognized. These evident truths have been asserted amongst others by Trousseau et Pidoux (*Traité de Thérapeutique*), Professor Flückiger (*Pharmaceutische Zeitung*), and by Messrs. Umney, Holmes, and Dr. Paul, at meetings of this Conference.

The only dissentient that I know of is Mr. de Neufville, who asserted in a paper read at the last Conference (*Pharm. Journ.*, vol. xii., p. 369), that the *supply* of *flat* calisaya during the past few years had been abundant, and the *quality* of *quill* calisaya had been good; but I cannot put that and that together so as to amount to a statement that in his opinion there had been an abundant supply of good calisaya bark; and even then I should be obliged to conclude that the preponderance of evidence was against him.

Thus far the cinchona difficulty appears to be geographical; good barks, far exceeding the modest pharmacopœial standard, being excluded because they do not grow west of Greenwich and do not bear the name of calisaya. These do not appear to be distinctions of sufficient importance to place in opposition to scientific tests. Dr. Paul put the case clearly and conclusively when he said that an alteration was necessary in the range of selection o. pharmaceutical barks; that South American barks should not be excluded, but that Indian barks should be admitted. In other words, let alkaloidal standard be the sole test.

In consequence of the "fearful deterioration of calisaya bark,"* and the unsatisfactory state of its pharmaceutical preparations, cinchona has fallen more and more into disuse, to the prejudice of pharmacy and of medical practice, its place having been usurped by quinine, contrary to the opinion of the best authorities upon the relative value of the two medicines. It is the province of pharmacists to rectify this miscarriage amongst their wares, and to restore one of the most valuable articles of the materia medica to its proper place and functions. It is not suggested that they should substitute even good Indian bark for inferior calisaya, when the latter or its preparations are prescribed, however unadvisedly; but that they should take care to have in stock bark of sufficient alkaloidal value (independent of the B.P. standard, which is too low) and that they should *educate* the medical profession to the use of it.

Although therapeutics are a forbidden subject, it may be permitted to quote the opinions of orthodox authorities upon the therapeutical qualities of cinchona and its alkaloids as an indication of the direction which pharmaceutical research ought to take, the more so as those opinions show that the chemistry of cinchona has hitherto moved in the wrong direction.

It has been well established by the Medical Commission appointed by the Government of India to investigate the febrifuge properties of the cinchona alkaloids,† and their conclusions are supported by the testimony of English and more especially of continental observers,‡ that the febrifuge and antiperiodic action of cinchona is common to *all* its alkaloids, and it follows that the exclusive employment of quinine, as it has long prevailed, is a wasteful mistake. But more than this, the best writers upon therapeutics assert that *cinchona* possesses medicinal properties superior to those of any or all of its alkaloids, which Dr. Pereira attributed in part to the astringent properties of the cinchotannic acid, and in part to the aromatic quality of the bark causing the alkaloids to sit more easily upon the stomach.§ From this it may be inferred that pharmaceutical preparations of cinchona would be free from the objection sometimes charged against the mixed alkaloids employed in India under the name of cinchona febrifuge, that they excite nausea. In Neligan's 'Medicines,' similar opinions are expressed, viz. (p. 737): "Most practitioners are of opinion that none of the alkaloids possess the same medicinal properties as cinchona bark, *more especially in the treatment of intermittent diseases*. . . . and . . . I must, however, confess that every day's increased experience induces me to prefer the preparations of bark to those of any of its alkaloids when a *tonic* effect is sought for."

Why then should "*most practitioners*" have so far changed their opinions, or at any rate so altered their

* See *Pharmaceutical Journal*, vol. ix., p. 213.
† *Pharmaceutical Journal*, vol. ix., pp. 78, *et seq.*
‡ Pereira, vol. ii., pt. ii., p. 132; Neligan, p. 736.
§ Pereira, vol. ii., pt. ii., p. 137.

practice, as to substitute quinine for cinchona almost universally, and particularly in those periodic diseases for which it is so emphatically asserted that none of its alkaloids possess equivalent virtues? Is it not, at least partly, because, in the words of Mr. Umney already quoted, "Calisaya bark has deteriorated to a fearful extent of late," and, as Dr. Paul told the Conference last year, "it now really contains nothing more than a little cinchonine."

It may be very loyal to the Pharmacopœia to continue the unquestioning supply of calisaya bark which was described upon the same occasion as "almost invariably worthless;" but how about the welfare of fever-stricken patients, and the credit of pharmacy? It must not be forgotten that the Pharmacopœia never initiates anything; it is a codex of remedies which have already been approved and which it has become desirable to place under control.

The reputation of cinchona has once before suffered, at a very early period after its introduction into Europe, from a similar deterioration in the importations of South American bark. The early supplies brought over from Peru by the Count and Countess of Chinchon (1640) proved so effectual in the cure of fevers and agues that more orders were sent out than the Peruvian merchants could execute properly, and they sent back consignments of inferior barks, which proved worthless and brought the new remedy into temporary disfavour. This deception is as good a reason as any other for the name of Jesuits' bark which was conferred upon it at about this period.

There was no quinine in those days or probably the parallel with our present experience would have been complete; but having no substitute the common sense of the 17th century set an example to the science of the 19th. It discarded the worthless barks and supplied itself with others of suitable alkaloidal standard assayed by the fever test. In these days of practical science brokers sell and quinine makers buy cinchona bark on the basis of its alkaloidal percentage, ascertained by exact analysis. The pharmacist alone buys hap-hazard the "showy barks," often very poor in alkaloids, and hence known as "druggists' barks," which the quinine makers are only too happy to leave for him and the dealers only too pleased to get rid of, though for pharmaceutical purposes percentage of alkaloids is more than a relative test of value,—it is an absolute test of fitness.

The very reverse ought to prevail; the pharmacist should secure the first choice by being willing to give a better price than the quinine makers, who can only give the alkaloidal value, which is literally the intrinsic value of a part of its constituents. Under this system the pharmacist would get much better value for his money than he does now by buying a "showy bark destitute of alkaloids." I have heard of a time-honoured establishment, which I must not further particularize, buying several serons of calisaya bark at 3*s.* 6*d.* lb., which proved to contain not a particle of quinine and only a very small amount of cinchonine. Its assay value certainly would not have exceeded 6*d.* This is a sort of bark which should be left for the stores, whom it would exactly suit, and where no questions are asked.

The question then is "What standard should be adopted for the cinchona of pharmacy?"

First, it should be an alkaloidal standard, not a quinine standard.

Secondly, it should be a mean and not an extreme standard.

And, thirdly, it should be catholic, admitting barks from all sources without arbitrary geographical distinctions, which, originally intended as definitions, have now become irrational limitations.

At the Conference of 1878, Mr. Umney spoke of East India bark containing 5 or 6 per cent. of quinia as the future source of fine fluid extract, and, if of fluid extract, of other pharmaceutical preparations. Assuming him to have meant 5 or 6 per cent. of mixed alkaloids, that would be a reasonable standard to insist upon,—say a minimum of 5 per cent., which holds a mean place between the extremes. I have computed the actual average of ninety-three lots offered on sale by the Dutch Government last year, and find that it is exactly 4·7 per cent. The highest quality reached 9·8 per cent., the lowest touched 1·2 per cent., giving a mean of 5·5 per cent. The mean of the two results is therefore 5·1 per cent.

It remains to be considered how this standard should be secured, for it is to be feared that pharmacists generally do not submit their purchases of cinchona to the pharmacopœial test, and it is as well to acknowledge that refined tests are not practicable in the pressure of daily business. Mr. Holmes, probably having this difficulty in view, suggested that the wholesale druggists should be required to state the percentage of alkaloids in the samples they offer, but this is scarcely sufficient for the protection or for the credit of the pharmacist.

The same difficulty seems to have presented itself to Messrs. Squibb, of New York, who have endeavoured to meet it by publishing what they consider a simple, easy process of assay suited to the wants and the skill of well-trained pharmacists who are not expert quinologists. Whether the process possesses the desired qualities of simplicity and facility may be judged by perusal of the description at p. 77 of the third number of Messrs. Squibb's 'Ephemeris.'

In pursuit of a similar object I have been led to prefer the more simple hydrochloric acid process, which I tried on the recommendation of Dr. De Vry, in his laboratory at the Hague and with the advantage of his assistance. The *modus operandi* finally adopted is as follows:—

Take 25 grams finely powdered cinchona bark, mix with 2·5 c.c. strong hydrochloric acid (=2·6 c.c. B.P. strength) in 30 c.c. distilled water, or just so much as suffices to moisten the bark; set by for two hours, add 100 c.c. distilled water and let stand for twelve hours or more, stirring occasionally, until all foam disappears from the surface. Pour into cylindrical glass percolator, the mouth of which has been stopped by a pinch of charpi loosely drooped into it and moistened with a little water, and recover the clear percolate. Pour on more water until the percolate ceases to be precipitated by caustic soda. In this way about 300 c.c. are recovered. Precipitate with caustic soda in considerable excess. Set the mixture by for twelve hours, when it will be found that the alkaloids have settled in a compact coherent stratum from which nearly the whole of the supernatant may be decanted. The decantate must be reserved. The precipitate is then poured upon a filter and washed with a little weak solution of soda to remove traces of cinchona red: finally it is washed with a little distilled water, the whole of the washings being added to the decantate and the measure noted. When the precipitate has drained it is to be carefully transferred to a tared porcelain dish, dried over water-bath and weighed. The weight should not be less than 1·25 grams, corresponding to 5 per cent. mixed alkaloids. But this will not be an exact indication of the alkaloids contained in the bark, as an appreciable quantity remains dissolved in the mother-liquor. Practically this may be estimated as 0·05 grams in 100 c.c., which should be added to the ascertained weight of the precipitate, and the sum multiplied by 4 gives a very close approximation to the true percentage, quite near enough for pharmaceutical purposes. When greater accuracy is desired the mother-liquor is treated with benzol and the alkaloids are recovered by operations which it is not necessary to describe as they need not be employed in pharmaceutical assays.

The merit of the above process is its simplicity and facility of manipulation; the several stages may be set going as opportunity offers and they proceed automatically without withdrawing the operator from other duties. Secondly, the results correspond with the amount of alkaloids which can be extracted in practical operations.

If it were not for the title of this paper there would be no reason for saying anything about the pharmaceutical preparations of cinchona. As it is, a very few words will suffice. It is notorious that they do not meet the demands of modern medical practice. Cinchona won its reputation by administration in the form of powder, it has lost it by the substitution of inferior preparations of inferior bark. The tincture, decoction and infusion of former generations have had their day and are becoming obsolete, never again to find favour with prescribers, pharmacists or patients. They are all too feeble in alkaloids for administration when the specific effects of cinchona are in question. Their qualities and their condemnation will be found in a paper by Mr. Ekin, in *Pharm. Journ.*, vol. ix., p. 213. Nor can it be necessary to pour more obloquy upon the much abused fluid extract, which has never yet found a single defender. Its poverty and its wastefulness have been often told. The best that can be said for it is that when carefully prepared from barks of suitable quality (which does not mean barks rich in alkaloids) it possesses agreeable astringent properties associated with an unimportant amount of alkaloids which render it acceptable as a vegetable tonic, but it leaves the major part of the valuable and characteristic cinchona principles in the imperfectly exhausted bark.

Fluid extracts are the pharmaceutical preparations of the day. Their convenience commends them equally to the medical practitioner, to his patient and to the dispenser, and the demand for them is not likely to be diverted; but a fluid extract of cinchona, worthy of its name, is still a desideratum in pharmacy.

The President proposed a vote of thanks to Mr. Giles. He feared the present was not the proper occasion for going into any question as to what principles the cinchona bark owed its therapeutical properties to; their time would not suffice to discuss that, even if they had sufficient medical knowledge to do so; but several important pharmaceutical questions had been brought forward in the course of the paper, and those might very profitably be discussed.

Mr. Wellcome said the subject of supplying chemists with bark of definite alkaloidal strength for dispensing and manufacturing purposes had been much discussed before, and he believed that some houses did offer to chemists with their bark an assay giving the definite alkaloidal strength. That was the custom of some houses in regard to opium, and he believed Dr. Squibb and others supplied the trade in America with barks with which he furnished assays. It appeared to him that that was one of the most important safeguards, and, while he thought it desirable that every chemist should be able to assay for himself the alkaloidal strength and to determine the amount of the respective alkaloids, it was hardly practicable that he should depend entirely on his own assays, and after all the guarantee of a respectable house would be the best general safeguard. As to the question of the strength that should be accepted as a standard for pharmaceutical preparations. Some members of the Conference might remember that he strongly urged last year that the quinine strength should not alone be accepted, but that a definite alkaloidal strength of the various alkaloids should be the only standard. A bark which yielded two per cent. of quinine ought to be satisfactory for manufacturing pharmaceutical preparations, providing it contained a proper amount of cinchonidine, quinidine and cinchonine, say to make 5 per cent. total alkaloidal strength. Quinoidine was also very active, and some of the preparations most sold in the Tropics for checking fever and ague consisted almost entirely of that resin, which was by many considered a modified or uncrystallizable quinine.

Mr. Southall said he could quite confirm the difficulty which had been mentioned in regard to getting a reliable calisaya bark for pharmaceutical purposes. There was still a good run on the preparations of bark other than the extract and tincture. The decoction was very much ordered by medical men in his part of the country, and was more relied upon than either the fluid extract or tincture.

Mr. Hampson thought they would be more likely to reach the point the author aimed at of having an accepted standard quality of bark, or bark yielding a certain proportion of alkaloids, if there were a standing committee of pharmacists, and not a pharmaceutical committee formed by the Medical Council entirely. The Pharmaceutical Society ought to be legally recognized in all these matters, and if practical pharmacists held their proper position with respect to the National Pharmacopœia these important changes or improvements would be sooner brought about. As it was these changes came about in an indirect and slow manner, and improvements did not take place as fast as they should.

Mr. Ekin said he feared the medical men in Birmingham had made rather an unhappy selection, according to Mr. Southall's statement, for in the experiments he had made, which were referred to by Mr. Giles, he found the decoction was by far the weakest in alkaloidal value of all the officinal preparations.

Dr. Symes confirmed Mr. Southall's statement that the decoction was very largely used and very much relied upon by medical men; it was not peculiar to Birmingham.

The President said it would be seen from the remarks which had been made that they greatly needed increased activity in the promotion of therapeutical research, and it would be well if there were a society for this purpose formed by medical men having competent chemical and physical knowledge.

Mr. Giles, in reply, said he could not claim that what he had brought forward was new, but still it sometimes did good to repeat what was already known. With regard to the alkaloidal standard, Dr. Pereira pointed out that cinchona made its reputation as a febrifuge by the use of a species of cinchona which was not rich in quinine, but in which cinchonine largely prevailed, and this seemed to show that they had made a mistake in pinning their faith so much to the alkaloid which happened to be first discovered. Although recent investigations appeared to show that it was necessary to give cinchonine or quinidine or cinchonidine in larger doses than quinine to produce the same effect, there appeared to be no difference in the effects produced and, therefore, it seemed to be a great waste to throw away that which might be recovered simultaneously with the quinine. At all events it seemed to him that it was rather their business to support the pharmaceutical manipulation of things than the chemical. He had often been disposed to think that chemistry had been ridden a little to death, and that isolation of active principles had been carried too far.

The following three papers were read succesively before a discussion was taken upon them:—

Note upon the Action of Glycerine on some Salts of Iron.

BY G. F. SCHACHT.

About two months ago our friend and fellow member Mr. Shenstone brought me the remains of a mixture that had been dispensed for him and which appeared to have undergone during the interval a somewhat interesting change. The prescription runs as follows:—

℞	Tr. Ferri Perchlor.	ʒiss.
	Glycerini	ʒvj.
	Aquæ	ad ℥vj.

M.

The mixture when first prepared was of a pale sherry colour, and possessed an astringent metallic taste. When brought to me, however, by Mr. Shenstone the colour had almost disappeared and the taste was sweet and metallic but not astringent. It appeared, in fact, as

though the iron had become reduced from the ferric to the ferrous condition.

The application of ferricyanide of potassium and of sulphocyanide of potassium showed us that this change had really taken place to a very considerable extent, but not quite to the complete reduction of the perchloride.

Mr. Shenstone kindly left the matter in my hands and I deem it of sufficient interest to bring before the Conference.

My first experiment naturally started with a repetition of the original prescription and an examination of the results at the moment of mixture, and though somewhat prepared for the fact by previous observation, I found it necessary to record as the first memorandum that the *tincture* of perchloride of iron taken from the ordinary dispensing bottle was no longer what it was when originally mixed, for it gave an emphatic bright green colour with ferricyanide of potassium.

It was clear, therefore, a change in the condition of the iron in the *tincture made with ordinary alcohol* had commenced to take place, similar to that suspected to have been developed under the influence of glycerine.

The mixture, however, still exhibited the usual deep red reaction with sulphocyanide of potassium, indicative of a plenteous proportion of unreduced ferric chloride. It was loosely corked and placed in a fairly light position in the laboratory, but not in direct sunshine.

After a fortnight's interval it was examined. It still in part retained its pale sherry colour, it produced a deep blue with ferricyanide and a much less deep red with the sulphocyanide of potassium.

It has been kept since that time (about three weeks) under similar conditions and I do not observe much further change.

A similar mixture was prepared and placed where it could *receive the direct rays of the sun.* After two days it was found to be colourless, to show abundant evidence of ferrous iron, but not to have entirely lost its property of reddening with sulphocyanide, nor has further exposure to the sun and the addition of more glycerine to the mixture entirely deprived it of this property.

Sunlight was also found to produce a similarly accelerating effect when the ferric chloride was subjected to the reducing action of ordinary alcohol.

It being clear, then, that glycerine possessed in a marked degree the power of reducing iron from the ferric to the ferrous condition, it was thought probable that it might be employed to prevent the converse change of ferrous into ferric salts which is sometimes so inconvenient.

A mixture was therefore prepared consisting of—

Ferrous sulphate	gr. x.
Dilute sulphuric acid	♏xv.
Glycerine	℥vj.
Water	to ℥vj.

and was kept in the diffused light of the laboratory. When first mixed it resisted all the fascinations of the sulphocyanide and bestowed upon it not the slightest blush, but after a few days the usual demoralization had commenced and the salt showed distinct signs of peroxidation. The amount of this action, however, appeared to have a limit, the proportion of ferric salt produced being very similar to that left unreduced in the former experiment.

Exposure to sunlight did not appear to influence this mixture in any special manner.

In connection with the probable further chemical changes that accompany these phenomena, I may mention the results of two further sets of experiments that were made, though I need not recite their details. They showed that both glycerine and ordinary alcohol reduce permanganate of potash rapidly.

I find that the behaviour of glycerine under treatment with permanganate has been already studied and that according to Kasmann (*Bull. Soc. Chim.*, [2], xxvii, 246) the change consists in the conversion of 2 molecules of glycerine *plus* 1 molecule of oxygen derived from the permanganate into 1 molecule of glucose and 2 molecules of water thus:—

$$2(C_3H_8O_3)+O_2=C_6H_{12}O_6+2(H_2O).$$

Whether the changes brought about by the persalts of iron are similar to the above throughout I am not at present prepared to assert, but that such should be the case appears to me very probable. The question is very interesting and will I hope one day be answered.

In the meantime, pharmacists and medical men may with advantage remember that ethyl alcohol and glycerine (and probably other alcohols) reduce persalts of iron and tend to prevent the oxidation of protosalts, and that this influence appears to be stronger when the mixture is exposed to sunlight than when it is left in the shade.

Note on a Reaction of Glycerin and other Polyhydric Alcohols.

BY WYNDHAM R. DUNSTAN, F.C.S.,

Demonstrator of Chemistry in the Laboratories of the Pharmaceutical Society.

The reaction which forms the subject of this note is one which has been observed during the course of an investigation upon the action of some polyhydric alcohols upon sodium biborate. The fact that when certain of these alcohols are added to a solution of borax an acid reaction results, was first noticed by Klein (*Compt. Rend.*, lxxxvi., 826). In the case of glycerin, this reaction has been further studied by Senier and Lowe (*Pharm. Journ.*, [3], viii., 819), who have also proposed a test for glycerin based upon it (*Journ. Chem. Soc.*, xxxiii., 438). In this reaction glycerin appears to resemble an acid in its action. If, however, the acid solution obtained by the addition of glycerin to an aqueous solution of sodium biborate be heated, the liquid becomes alkaline. The first published observation of this fact was made by Donath and Mayrhofer (*Zeits. f. anal. Chem.*, xx., 379), who considered this reaction characteristic of glycerin and propose to employ it as a test for this substance, using litmus as an indicator of the reaction. No test experiments, however, are detailed by these observers. In the present note the results of some experiments are given which, although not originally instituted for this purpose, indicate the delicacy of the reaction and also its invalidity when considered as specially characteristic of glycerin.

A number of experiments were first made to determine the delicacy of the reaction. The results led to the employment of a dilute solution of sodium biborate and to the abandonment of litmus as an indicator of the reaction. Even when a dilute solution of borax was employed the colour-changes of the litmus were ill defined. Other indicators were then experimented with and, finally, satisfactory results were obtained by the use of phenol phthalein. When an alcoholic solution of this substance, which is faintly yellow, is added to a solution of borax a rose-red colour is produced owing to the alkalinity of this salt. Upon the addition of glycerin to this solution the red colour at once disappears, the solution being acid and colourless. Upon heating the liquid the rose-red colour is again developed, reaching the maximum tint near the boiling point of the solution. As the liquid cools, the colour gradually fades away, until finally the solution is again colourless. The colour-changes are sharp and well defined. Experiments have been made with solutions of borax of various strengths; the best results were obtained with a half per cent. solution. A convenient method of applying the test is to take two cubic centimetres of a half per cent. solution of borax and add sufficient of an alcoholic solution of phenol phthalein to impart a decided rose-red colour. To this liquid gradually add the solution of glycerin made neutral or faintly alkaline, until the colour is discharged. Heat the solution to

the boiling point, the red colour is restored, and after cooling the liquid is again colourless. Excess of glycerin is to be avoided, otherwise the alkalinity of the solution is only partially restored by boiling. The delicacy of the reaction is dependent not only upon the excess of sodium biborate which might be present, but also upon the amount of water. If the colourless solution obtained in the above manner be largely diluted with water the red colour is partially restored. After a great many experiments it was found that using a half per cent. solution of borax the limit of the test is practically reached at a two per cent. solution of glycerin. Using two cubic centimetres of borax solution, about five cubic centimetres of a two per cent. solution of glycerin were necessary to discharge the colour. When a stronger solution of glycerin is used the amount required will of course be less than that of a two per cent. solution, but not proportionately less, for the more dilute the solution of glycerin the greater is the action of the water, which tends to reproduce the alkalinity of the solution. Hence the quantity of a stronger solution of glycerin required will be less than the proportional amount calculated from a more dilute solution. The test is not satisfactory with solutions of glycerin of greater dilution than two per cent., as the changes of colour become indefinite, owing to the action of the water. Neither can a more dilute solution of borax than a half per cent. solution be used for the same reason. I have made a series of experiments upon the utilization of this reaction as a basis for the quantitative estimation of glycerin, but so far the results have not been altogether satisfactory. The reaction is far from characteristic of glycerin, but is more so of the polyhydric alcohols in general. I find that it is also given by mannite, erythrite, dextrose, levulose, lactose and mycose. Sucrose (cane sugar) does not behave in the same way. In the case of mannite the reaction is extremely delicate, more so than with glycerin, and the solution is not so amenable to the influence of water as is the solution of the latter substance. Guaiacol, pyrogallol and saligenin also give the reaction. Orcin and resorcin, when added in large quantity, partially destroy the red colour, but it is not restored by boiling.

Ammonium salts, which are known to liberate boracic acid from solutions of borax (Woodcock, *Journ. Chem. Soc.*, xxiv., 785), discharge the red colour of the test solution, but it is not restored upon heating. In testing liquids for glycerin by this method ammonium salts should be removed by ebullition with sodium carbonate, and the solution either made nearly neutral or evaporated and extracted with a mixture of ether and alcohol before applying the test.

It appears from the above experiments that this reaction is not only given by glycerin but also by many other polyhydric alcohols, both of the paraffin and benzene series, and by certain sugars. Therefore in testing for glycerin by this method the absence of these substances must be ensured. I hope in a future paper to show precisely the nature of the reaction which occurs between certain of these polyhydric alcohols and sodium biborate.

The Solubility of Boric Acid in Glycerine.

BY DAVID HOOPER,

Pharmaceutical Chemist.

The extended application that has recently been made of boric acid combined with glycerine has created a demand for these two antiseptics in many forms. The most prominent among them is a preparation introduced by Professor F. Barff, M.A., and named by him "Boroglyceride" (*Journal of the Society of Arts*, xxx., 516), and still later the glycerborate of calcium and the glycerborate of sodium fully described by M. Le Bon (*Comptes Rendus*, xcv., 145). But it appears, on reference, that a more simple preparation, the mere solution of the one substance in the other, has been little investigated, or at any rate determined, and therefore some experiments were instituted to elucidate this point, and after determining the strength of a saturated solution at the mean temperature of our latitude, observations were continued in order to discover the relationship this result bore to its solubility at other temperatures.

As only two chemical bodies were to be employed in the following determinations, special attention was directed to their purity. The boric acid ($B_2O_3,3\,H_2O$) was free from compounds of ammonium and magnesium, and from other salts and acids likely to be met with in its natural state or in its preparation from borax. Its specific gravity was taken and found to be 1·485. It was used in fine powder and kept under a bell jar over sulphuric acid to prevent absorption of moisture or gases. The glycerine was a very pure sample, it had a gravity of 1·260 at 15·5° C. and was always measured as near this temperature as possible.

The viscid nature of the glycerine, its slower dissolving capacity, and the alteration of boric acid when subjected to heat, make it tedious to estimate their solubility by any of the few ready methods employed when water is the solvent. It eventually occurred to the author that in a case like this some physical formula involving a knowledge of density and volume might well be utilized. As a datum, therefore, a solution was thus prepared. An excess of boric acid was added to some glycerine, half filling a pint bottle, the mixture was kept with frequent agitation in an apartment where the temperature ranged from 18° C. to over 20° C., after three days the solution was poured off and transferred in another bottle to a cellar where it was kept for a similar period at 16° C. A slight crystalline deposit had formed in the mixture, due to the reduction of temperature. The specific gravity of the resulting saturated solution was then carefully taken. The weight of a certain volume and the gravities of its constituents being known, the following formula was used to obtain their proportions:—

$$V = V_1 + V_2$$
$$VS = V_1S_1 + V_2S_2$$

when V, V_1, V_2 represent the volumes of the mixture, the glycerine and the boric acid respectively, and S, S_1, S_2, their relative gravities.

The working of this formula may be illustrated by calculating from an actual experiment. The weight of a saturated solution when taken in a 1000 grain bottle was found to be 1290 grains. Substituting this with the other data the formula becomes

$$1000 = V_1 + V_2$$
$$1290 = V_1.1{\cdot}260 + V_2.1{\cdot}485$$

these two equations worked out simultaneously will give for glycerine, 866·6 and boric acid, 133·3 grain volumes per thousand; the volume of the last-named substance has, however, to be converted into weight. Then by proportion, it is shown that 4·37 parts by volume of glycerine dissolve 1 part by weight of boric acid at 16° C.

Some experiments were also made by mixing different quantities of glycerine with the same amount of boric acid and agitating them occasionally for several days, when it was again determined that 4·4 c.c. or practically $4\frac{1}{2}$ c.c. of glycerine were sufficient to dissolve 1 gram of boric acid.

The methods used for determining the saturation point at higher temperatures were according to the following description:—The apparatus employed was, a long test tube furnished with a rubber stopper and graduated from the bottom in cubic centimetres accurately corresponding with those marked on a burette containing the glycerine, and a water-bath consisting of two beakers containing water, the one immersed in the other of larger size, and placed at such a distance over the source of heat so that the temperature might be regulated to any desired degree. A weighed quantity of boric acid and a measured quantity of glycerine were run into the tube, the acid being in excess, glycerine was cautiously dropped in until, after remaining in the water-bath for about half an hour, perfect solution was obtained. The temperature

was then lowered and the degree at which the mixture began to be turbid was noted, and this was used as a check on the particular determination. After numerous experiments in this manner a line of solubility was formed extending to the boiling point of water. Some of these higher saturation points were tested by keeping the mixtures in stoppered bottles in an air oven with regulated temperature, but I consider the determinations as detailed in the above description would be performed with more expedition if not with more accuracy. It now remained to take the solubility at zero; this was found by diluting a saturated solution with glycerine until the acid ceased to crystallize out when immersed for half an hour in a tube in melting ice.

In the following table the results are exhibited as parts by weight dissolved in 100 parts by volume of the solvent; such a representation is found in the lines of solubility shown in Fownes's 'Inorganic Chemistry' (p. 144):—

Solubility of Boric Acid in 100 *parts of Glycerine from* 0° *to* 100° *on the Centigrade Scale.*

20	parts at	0°
24	,,	10°
28	,,	20°
33	,,	30°
38	,,	40°
44	,,	50°
50	,,	60°
56	,,	70°
61	,,	80°
67	,,	90°
72	,,	100°

The solubility of boric acid in water has been determined by Brandes and Firnhaber (Watt's 'Dictionary of Chemistry,' i., p. 639), the results were calculated so as to make a line comparable with the table just represented. The line formed is not absolutely straight, and although it occurs much lower down on the scale, it is not parallel; a slender convergence takes place in the direction of zero. I propose, if opportunity is afforded, to make fuller comparisons of these two lines and find what relation exists between them when lines of solubility are formed by dissolving the boric acid in glycerine diluted to various strengths with water.

Votes of thanks having been passed to the authors of the above papers,

The President said Mr. Schacht's note was very acceptable, and was a model in many respects. It belonged to a class which was always welcome, being the result of observations in the course of dispensing. With regard to the reaction itself, it had long been known that perchloride of iron was reduced to a ferrous condition by alcohol, and indeed there was in a former North German Pharmacopœia a preparation called ethereal spirit of chloride of iron, made by dissolving the perchloride of iron in alcohol and exposing it to light until the green colour was produced, and a tincture of a very pleasant flavour was obtained. Apparently the reaction was more rapid with glycerine. There might be a reaction such as Mr. Schacht had described, and probably there was a reaction with the glycerine, that substance being, indeed, an alcohol, a polyhydric alcohol as Mr. Dunstan had remarked. Mr. Dunstan's paper had considerable interest, inasmuch as it would throw light on the constitution, not only of glycerine, but of boric acid, and borax; all which substances being used in pharmacy, any further knowledge respecting their constitution would be interesting to pharmacists. Mr. Hooper's paper seemed rather to bear on the action of antiseptics. Not only were chemists and druggists interested in the preparation and sale of antiseptics, but advice respecting their employment might be very properly given by pharmacists. It was very gratifying to see that Mr. Hooper had produced a paper of this kind involving a large amount of skill and knowledge, just the paper that should be produced by a chemist who was also a druggist.

Mr. Kingzett said there was no reason to suppose that the antiseptic property of boroglyceride was any greater or more definite than that of boracic acid on the one hand, or glycerine on the other, or a mixture of the two substances into which the compound is resolved again by the agency of water, or even of the tissues in which water is always present. He therefore failed to see on what grounds this substance was put forward as a new or improved antiseptic. Boroglyceride might be regarded for all practical purposes as a mixture of glycerine and boracic acid, and there was no evidence on record pointing to the superiority of the compound as an antiseptic.

Mr. Gerrard was very much pleased with Mr. Schacht's communication, because it explained what took place in a perchloride of iron mixture which was very largely used in his hospital. It always contained some glycerine, and he found, after standing a week or so, the last portion was much clearer in colour than when first made, consequently a mixture made with this residual portion differed in colour from that first made, and it was often a question asked of dispensers why the mixture sometimes appeared dark and at others light. The explanation now given seemed very satisfactory.

Mr. Schacht, in reply, said he had nothing further to add except this, that he must acknowledge he did not remember, perhaps he never knew of the German preparation that had been referred to, but he was aware that there had been plenty of observations bearing upon this point by other men, and he should not have troubled the Conference with it, but at the time he first made his notes he thought it was just possible that he should be able to add something to what was known of the processes that went on during the change. The difficulties of the case, however, had been a little too much for him, and he had not been able as yet to determine what exact changes did take place.

(*To be continued.*)

Parliamentary and Law Proceedings.

Excise Prosecution.

At the Hull Police Court, on Tuesday, September 12, 1882, before Mr. E. C. Twiss, Stipendiary Magistrate, Robert Banks, chemist and druggist, Porter Street, was summoned by the Excise authorities "for unlawfully selling a certain article, capable of being used internally as a medicine, viz., paregoric, in the preparation of which methylated spirits and derivatives of methylated spirits had been used."

Mr. Claxton, Inspector of Inland Revenue, stated that, from complaints that had been made, two samples of paregoric were purchased at the defendant's shop, which were analysed, and both found to contain methylated spirit instead of ordinary alcohol, but in different quantities in each, which must have been taken from two different sources.

The defendant admitted the offence, and could only account for it by supposing that the paregoric had been taken out of the wrong jug, as he had one containing methylated spirit and the other ordinary spirit. He was not certain whether he or his assistant served it.

His Worship said defendant had made himself liable to a penalty of £100. He would be fined £10, including costs.—*Eastern Morning News.*

Suicide by Hydrocyanic Acid.

On September 14, Mr. Malcolm, coroner for Leeds, held an adjourned inquest touching the death of Mr. Wm. Hornby, a gentleman, aged 71 years, and who had formerly held the office of an alderman of the borough. The deceased was found dead in bed, and a *post-mortem* examination and chemical analysis made by Mr. Scattergood revealed the presence of hydrocyanic acid. A bottle which had contained the poison was found in the bedroom. From the evidence, it appeared that the deceased applied at the shop of a chemist where he was well known for an

ounce of hydrocyanic acid, stating that he wished to kill a dog. From a letter addressed to his son by the deceased a deliberate intention of self-destruction was manifest, the cause being pecuniary difficulties originating in railway speculations some time since. The jury found that deceased died from poisoning, and that he was of sufficiently sound mind to know what he was doing.

Poisoning by Laburnum Seed.

At Richmond, Yorkshire, on Monday week, three young boys were poisoned by eating the seed which had fallen from a laburnum tree near the infant school in Dundas Street. Whilst at school during the afternoon the children vomited a good deal. Medical aid was afterwards obtained, and although the usual restoratives were applied, the boys continued in a very bad state until midnight, when they took a turn for the better, and they are now making favourable progress. There have been several similar cases in the town lately, but none of them have proved fatal.—*Leeds Mercury.*

Poisoning by Aconite.

A peculiar case of poisoning by aconite has come under the notice of Mr. Frederick G. Baker, one of the house surgeons at the Poplar Hospital, and from which no less than five persons are suffering. From what the surgeon has learned, it appears that one of the persons poisoned (a young man) saw something drop from one of Messrs. Pickford's vans, and on picking it up thought it to be a piece of horseradish. He tasted it, and on finding the root palatable he ate some and gave a piece each to three other young men, one of whom gave a portion to his sister. Alarming symptoms of poisoning soon began to show themselves, and the sufferers were taken to the Poplar Hospital, where Mr. Baker managed to keep up artificial respiration for about four hours, when the effects of the aconite began to be exhausted. The symptoms exhibited by the poisoned persons were paralysis of the legs and arms and a burning sensation on the tongue. A piece of the supposed root was examined by Mr. Baker, who at once found that it was aconite. All the persons are now nearly recovered.—*Leeds Mercury.*

Obituary.

Notice has been received of the death of the following:—

On the 15th of July, Mr. Henry James Henderson, Chemist and Druggist, Shieldfield, Newcastle-on-Tyne. Aged 62 years.

On the 7th of August, Mr. John Woods, Chemist and Druggist, North Street, Chichester. Aged 66 years.

On the 8th of August, Mr. Joseph Frederick Malins, Chemist and Druggist, The Dispensary, Reading. Aged 54 years.

On the 19th of August, Mr. James Sinclair, Chemist and Druggist, Llandudno. Aged 66 years. Mr. Sinclair had been a Member of the Pharmaceutical Society since 1877.

On the 23rd of August, Mr. William Graham Carr, Pharmaceutical Chemist, Berwick-upon-Tweed. Aged 78 years. Mr. Carr had been a Member of the Pharmaceutical Society since 1841.

On the 26th of August, at Scarborough. Mr. Edward Cass Coverley, Chemist and Druggist. Aged 51 years.

On the 1st of September, Mr. Henry Brearley, Chemist and Druggist, Swine Market, Halifax. Aged 41 years.

On the 2nd of September, Mr. George Frederick Kent, Chemist and Druggist, Shirehampton, near Bristol. Aged 44 years.

On the 4th of September, Mr. James Watmore, Pharmaceutical Chemist, Peach Street, Wokingham. Aged 31 years.

On the 5th of September, Mr. Hamilton Murray, Chemist and Druggist, Lancaster Street, Newcastle-on-Tyne. Aged 50 years.

On the 9th of September, Mr. Samuel Johnson, Pharmaceutical Chemist, Church Street, Liverpool. Aged 70 years. Mr. Johnson had been a Member of the Pharmaceutical Society since 1841.

On the 14th of September, Mr. Andrew Brunton, Chemist and Druggist, Partick, N.B.

Correspondence.

The Decomposition of Salicin.

Sir,—Permit me to remark upon certain of the points raised in the discussion which followed Mr. Brownen's paper at the late Conference meeting, as reported in your issue of last week.

With the general tenour of Mr. Kingzett's remarks I perfectly agree, but they contain one statement which I believe to be an error, and one which is so widely repeated that I venture to point it out a second time. The statement I refer to is that if salicin "were boiled with a dilute acidulated solution, the compounds mentioned by Mr. Brownen would be obtained, viz., glucose and saligenin." In a paper published in this Journal ([3], ix., 865) I showed that saligenin cannot be obtained by the action of boiling dilute acid upon salicin in quantity sufficient to give the blue colour with a ferric salt, much less to give the crystalline scales mentioned by Mr. Brownen. The fact is that though perhaps saligenin is formed in an intermediate reaction, the action cannot be stopped at that point, and the result is invariably glucose and saliretin. In the paper referred to I quoted the original investigator of the reaction in support of my results, and against the statements of most works on chemistry. If, however, anyone can show how different results may be obtained I shall readily admit that I am wrong.

Another point I wish to refer to is mentioned by Mr. Groves, and is certainly important. Have the digestive ferments any action upon each other which modifies their activity in any important respect? Some experiments of mine, published in the *Pharmaceutical Journal* ([3], ix., 751), though fragmentary, bear directly on this. They prove that in the case of a starch-converting ferment, such as that of malt, its activity is not affected by the presence of pepsin (itself not starch-converting) nor by a very weak acid, but that it is destroyed by a certain degree of acidulation.

Professor Attfield showed his usual tact in his veto of a discussion upon the "mysterious factor" or "vital force," but at the same time, as Dr. Symes pointed out, it is practically impossible in the chemical laboratory to imitate the conditions which obtain in the living alimentary canal. While, therefore, it must be admitted that the value of such an investigation as Mr. Brownen has commenced is immensely reduced by this fact, still its importance as a check upon purely biological evidence is quite enough to induce a hope that the subject will be thoroughly studied.

Alfred Senier.

R. G. Mumbray.—(1) *Suæda fruticosa*; (2) *Suæda maritima*; (3) *Euphorbia Paralias*; (4) *Senebiera Coronopus*; (5) *Aster Tripolium.*

J. J. Hall.—(1) *Polysiphonia fastigiata*; (2) *Fucus canaliculatus*; (3) Fruit of *Fucus platycarpus.*

Asthmaticus.—See a paper on "Drug Smoking," in vol. x. (1878), p. 386.

Gulielmus.—Rectified "oil of tar," a product of the distillation of wood tar.

Silvester.—We do not think there is any special law regulating the practice of pharmacy in the country.

F. J. H.—The doctor is right. A little consideration should show you that the rule to which you refer is a necessary one. At any rate you appear to have been acquainted with it, but chose to ignore it; you have, therefore, no fair ground of complaint.

F. J. Jackson.—*Spergula arvensis.*

Communications, Letters, etc., have been received from Dr. W. J. Clark, Messrs. Klinker, Umney, Lamble, Foster, Beck, Hart, Pratt, Kempenfeldt, Mason, 1878.

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The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.

BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.

Prospectus and samples free on application.

Warehouses, 154 and 155, Whitechapel Rd., London. P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

Regist. Trade Mark, No. 22,133.

Retail 1½d. each.

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OFFERED TO THE

Retail Chemists of Gt. Britain.

To counteract cutting houses, and to keep up the Retail Price, the MANNA CAKE is supplied to *one Retail Chemist only* in each district, who has Exclusive Wholesale Profits. *Local Chemists must of necessity order through the Agent.* British Wholesale Drug Houses need not apply. 130,000 have now been ordered. Quantity sent to suit population. All newspaper arrangements are made by the agent at maker's expense. Extracts from recent letters of acceptance:—"Your terms seem so fair and straightforward, I shall be pleased to take the monopoly for this quarter, taking 150 gross. Though the quantity appears large, I am confident I shall get through the first 50 in three or four months."—Mr. S. STEPHENS, Milnsbridge, Huddersfield. "I will accept the Birmingham agency, taking 50 gross."—Mr. THOMASON, Dudley St., Birmingham. "Send 20 gross, and make me sole consignee for Bristol."—Mr. JNO. STROUD, Wine St., Bristol. N.B.—The output is eight times what it was in June last.

For Terms send Stamp to Depôt, 268, Walton Rd., Liverpool.

OL. LAVAND. RECT.

Now largely used in perfumery as a substitute for the Mitcham Oil. *Price 21s. per lb. of*

SYMES & CO. LIVERPOOL

London Depôts—8, SNOW HILL, & 1, AUSTRALIAN AVENUE.

Printed matter with address.

Names of Agents advertised.

TERMS FOR ADVERTISEMENTS
IN THE
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GUARANTEED CIRCULATION
7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, as also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6d. Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

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Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

J. & A. Churchill, 11, New Burlington St., London, W.

WYE HOUSE ASYLUM, Buxton, Derbyshire, for the Middle and Upper Classes of BOTH SEXES, is beautifully situated in the healthy and bracing climate of the Derbyshire Hills, and is directly accessible by the Midland and London and North Western Railways. For terms and other particulars, address the Resident Physician and Proprietor, Dr. F. K. Dickson.

KEMMERICH'S
EXTRACT OF MEAT,

According to analysis, is the best. Prepared at the Company's own Works, Santa Elena, South America. Sole Agents, Rockwood & Co., 12, Long Lane, E.C. Agents required.

Dr. Arthur Hill Hassall, M.D.: "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

Mr. Charles H. Piesse, F.C.S., Public Analyst:—"As the result of my careful examination of the Extract of Meat (E. Kemmerich & Co.), I find it to be absolutely pure. It contains a very large percentage of solid constituents of Meat. The nutritive value is of the highest order."

King's College, London, Medical
DEPARTMENT.

The WINTER SESSION will be opened on Monday, October 2nd, at 4 p.m., when the Distribution of Prizes will take place, and an Address be given by the Right Hon. W. H. Smith, M.P.

A Special Course of Instruction has been established for the Preliminary Scientific Examination at the University of London, including Inorganic Chemistry, Practical Chemistry, Practical Biology, Experimental Physics, Zoology, and Botany.

The following Entrance Scholarships will be given in October next, viz.:—

Two on the Warneford Foundation of £75 each, for previous Education in General Literature and Science.

Two by the Clothworkers' Company—one of £100 and one of £50—for proficiency in Science only.

Two on the Sambrooke Foundation, viz.:—one of £60 and one of £40, for proficiency in Literature and Science.

During the ensuing Session there will be awarded five Medical Scholarships, viz.:—one of £80, one of £30, and three of £20, for professional efficiency; one for Chemistry of £40; one of £50 for resident students only; and two Sambrooke Registrarships of £50 each.

Endowed Prizes of the value of 65 guineas and College Prizes of the value of £60 are also awarded annually.

For Prospectuses and other information apply personally, or by post-card, to J. W. Cunningham, Esq., King's College, London; or to Professor Bentley, Dean of the Department.

TO CHEMISTS.

BEFORE ORDERING ALMANACS SEND FOR SAMPLE OF

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Title Registered.] J. DAVIS'S TOILET ALMANAC, 1883.

- Handy for the Pocket Book and Dressing Table.
- Perfectly Unique in Style.
- Best Value for Money in the Market.
- Largest Number of Pages at the Price.
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- ☞ Send Stamp for Samples in Book and Card Form.

J. DAVIS { Medical & Commercial Printer, STEAM WORKS— 201, Old Kent Rd., London, S.E.

JETTINE,

The only preparation which does not injure the leather.

Produces a perfectly black and permanent gloss, which will not rub off even when wetted, nor soil the most delicate article of dress.

It is invaluable for Ladies' and Children's Boots and Shoes, Waist Belts, Travelling Bags, &c. Each bottle is neatly packed in a cardboard box, and contains a sponge mounted and ready for use: thus JETTINE may be applied without soiling the hands.

MAY BE OBTAINED OF

Barclay & Sons, 95, Farringdon St., E.C.
Edwards & Son, 157, Qn. Victoria St., E.C.
Evans, Lescher & Webb, 60, Bartholomew Close, E.C.
Hovenden & Sons, 5, Gt. Marlboro' St., W.
Lynch & Co., 171A, Aldersgate St., E.C.
Maw, Son & Thompson, Aldersgate St., E.C.
May, Roberts & Co., Cowcross St., E.C.
Sanger & Sons, 150, Oxford St., W., or of
E. Penton & Son, 1 and 3, Mortimer St., W.

The London Hospital and Medical COLLEGE.

HOSPITAL STAFF.

Consulting Physicians—Dr. Herbert Davies, Dr. Ramskill.
Consulting Surgeon—Mr. Curling, F.R.S.
Physicians—Dr. Andrew Clark, Dr. Langdon Down, Dr. Hughlings Jackson, F.R.S., Dr. Sutton, Dr. Fenwick, Dr. Stephen Mackenzie, Dr. Sansom.
Assistant-Physicians—Dr. Charlewood Turner, Dr. Gilbart-Smith, Dr. Warner, Dr. Ralfe.
Surgeons—Mr. Hutchinson, F.R.S., Mr. Couper, Mr. Rivington, Mr. Jas. Adams, Mr. Waren Tay, Mr. McCarthy.
Assistant-Surgeons—Mr. Reeves, Mr. Fredk. Treves, Mr. C. Mansell Moullin.
Obstetric Physician—Dr. Palfrey.
Assistant Obstetric Physician—Dr. Herman.
Ophthalmic Surgeons—Mr. James Adams, Mr. Waren Tay.
Aural Surgeons—Dr. Edw. Woakes and Mr. T. Mark Hovell.
Surgeon-Dentist—Mr. Ashley W. Barrett.

LECTURERS.

Medicine—Dr. Stephen Mackenzie.
Surgery—Mr. Jas. Adams.
Operative Surgery—Mr. Jas. Adams.
Practical Surgery—Mr. Reeves.
Anatomy—Mr. Rivington.
Practical Anatomy—Mr. Fredk. Treves.
Physiology and Practical Histology—Mr. McCarthy.
Chemistry—Dr. C. Meymott Tidy.
Comparative Anatomy—Mr. C. Mansell Moullin.
Pathology—Dr. Sutton.
Midwifery—Dr. Palfrey.
Toxicology—
Botany—Dr. F. Warner.
Medical Jurisprudence—Dr. C. Meymott Tidy.
Materia Medica—Dr. Prosser James.
Diseases of the Eye—Mr. Jas. Adams.
Diseases of the Throat—Dr. Morell Mackenzie.
Diseases of the Ear—Dr. Edwd. Woakes.
Anatomy & Pathology of the Teeth—Mr. Ashley W. Barrett.

The SESSION 1882—1883 will commence on Monday, October 2nd, 1882, when an Introductory address will be delivered at the College by Jonathan Hutchinson, Esq., F.R.S., Senior Surgeon to the Hospital, at 8.30 p.m., to be followed by a Conversazione, to which all past and present Students are invited.

Fee for Lectures and Hospital Practice, 90 guineas in one sum, or 100 guineas by three instalments.

The Hospital contains nearly 800 beds. Number of In-patients during 1881 was 6,840, Out-patients 58,307.

THE RESIDENT AND OTHER HOSPITAL APPOINTMENTS are free to full Students. The Resident Appointments consist of five House-Physiciancies, five House-Surgeoncies, and one Accoucheurship; also two Dresserships and two Maternity Assistantships.

TWO ENTRANCE SCIENCE SCHOLARSHIPS, value £60 and £40, and TWO BUXTON SCHOLARSHIPS, value £30 and £20, will be offered for competition at the end of September to new Students.

The Letheby Prize, value £30, for proficiency in Chemistry.

A Scholarship, value £20, in Human Anatomy and Physiology, to first year's Students.

A Scholarship, value £25, in Anatomy, Physiology, and Chemistry, to second year's Students.

A Scholarship, value £20, in Clinical Medicine.

A Scholarship, value £20, in Clinical Surgery.

A Scholarship, value £20, in Clinical Obstetrics.

A Duckworth Nelson Prize, value £10 (biennial), in Clinical Medicine and Surgery.

Prizes, value £60, to Dressers of Out-patients in Minor Surgery.

Special entries for Medical and Surgical Practice are made.

The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis.

For prospectus and particulars, apply personally, or by letter, to Mile-end, E. MUNRO SCOTT, Warden.

Mechanics' Institution and Literary SOCIETY, LEEDS.

CHEMICAL LABORATORY.—WINTER SESSION, 1882-83

The EVENING CLASSES commence SEPTEMBER 29th.
Teacher, Mr. GEO. WARD, F.C.S
Detailed Prospectus may be had on application.

STUDENTS AT THE SQUARE,

ON the look out for Partial Board and Lodging, with the comforts and advantages of home, should write for particulars to V. B., 96, Gillespie Rd., N. Half-an-hour's journey from Bloomsbury Sq. Assistance given in evening studies. Terms moderate.

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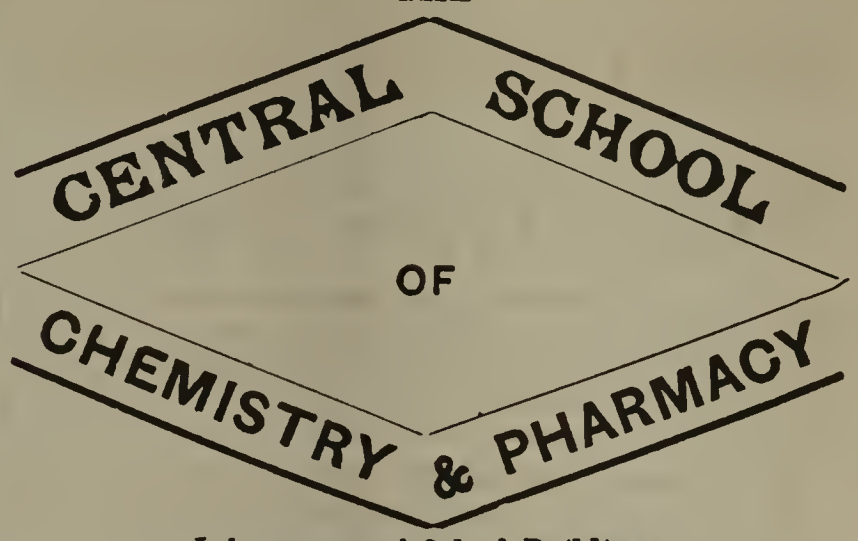

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The next **complete** Course of Lectures will commence on Monday, Jan. 1st, 1883, but a **short one**, embracing all the principal facts, will be held from Monday, Oct. 30th, to the December Examinations. The fee for this short course is **4 guineas**, and it is especially recommended to candidates who have already undergone a course of study and wish to complete their education under a system that will the best ensure their success. Candidates are requested to bear this fact especially in mind, viz., that most of the Students of this School pass the **first time** of their presentation. For Prospectus, apply to

Messrs. LUFF & WOODLAND.

St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

IMPORTANT TO CHEMISTS & DENTISTS.

MR. A. GEAR, 21, The Pavement, Clapham Common, executes all kinds of Mechanical Dentistry expeditiously and at moderate charges. N.B.—Instruction given in all branches of Dentistry. Price list and terms upon application.

Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xvi.

The Dental Hospital of London

MEDICAL SCHOOL, LEICESTER SQUARE.—The WINTER SESSION will commence on MONDAY, OCTOBER 2.

LECTURES.

Mechanical Dentistry—Dr. Walker, M.R.C.S., L.D.S., on Wednesdays, at 7 p.m., commencing on October 4.

Metallurgy—Prof. Huntingdon (King's Coll.), F.I.C., F.C.S., &c., on Tuesdays, at 12 o'clock, commencing on October 3.

The SUMMER SESSION will commence in May, 1883.

Dental Surgery and Pathology—Mr. Alfred Coleman, F.R.C.S., L.D.S., on Tuesdays and Thursdays, at 8 a.m.

Dental Anatomy and Physiology (Human and Comparative)—Mr. C. S. Tomes, F.R.S., M.A. Oxon, M.R.C.S., L.D.S., on Wednesdays and Fridays, at 8 a.m.

General Fee for Special Lectures required by the Curriculum, £15 15s.

DENTAL HOSPITAL OF LONDON.

Consulting Physician—Sir Thomas Watson, Bart, M.D.
Consulting Surgeon—Mr. Christopher Heath, F.R.C.S.
Consulting Dental Surgeons { Mr. S. Cartwright, F.R.C.S. / Mr. John Tomes, F.R.S.

		Dental Surgeons.	*Assist.-Dental Surgeons.*
Monday,	9 a.m.	Mr. D. Hepburn	Mr. F. Canton.
Tuesday,	,,	Mr. Medwin	Mr. A. S. Underwood.
Wednesday,	,,	Mr. Gregson	Mr. Truman.
Thursday,	,,	Mr. Hutchinson	Mr. R. Woodhouse.
Friday,	,,	Mr. Moon	Mr. Storer Bennett.
Saturday,	,,	Mr. A. Hill	Mr. G. Parkinson.

Chloroformists { Mr. Clover, F.R.C.S.; Mr. Braine, F.R.C.S.; Mr. Bailey, M.R.C.S.; Mr. T. Bird, F.R.C.S.

Medical Tutor—Mr. Morton Smale, M.R.C.S., L.D.S., L.S.A.
Demonstrators—Mr. Claude Rogers, M.R.C.S., L.D.S., D.M.D., and Mr. John Ackery, M.R.C.S., L.D.S.
House-Surgeon—Mr. W. Hern, M.R.C.S., L.D.S.
Assistant House-Surgeon—Mr. Cornelius.

The Medical Tutor holds Classes before each examination. The Demonstrator attends each day.

The House-Surgeon and Assistant House-Surgeon attend daily while the Hospital is open.

On every day during the Lecture Session the Surgeons of the day will, if practicable, give Demonstrations, especially intended for the Junior Pupils, of the Operation performed in Dental Surgery.

The Saunders Scholarship of £20 per annum and Prizes are open for competition.

Fee for Two Years' Hospital Practice required by the Curriculum, £15 15s. Fees for Lectures and Practice, £31 10s. Additional Fees for a General Hospital for the two years to fulfil the requirements of the Curriculum vary from £40 to £50.

Further particulars may be obtained on application to the Dean, at his private residence, 11, Bedford Square, W.C., or at the Hospital, where he will attend in the afternoons from September 26th to October 1st, inclusive, from 5 till 5.30 o'clock, or on Wednesday mornings from 10.30 till 12.0.

T. F. KEN UNDERWOOD, Dean.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

THE MASON SCIENCE COLLEGE,

BIRMINGHAM.

The NEXT SESSION will commence on Tuesday, October 3, 1882.

The Calendar, containing full information as to the Classes, Fees, &c., is now published by Cornish Brothers, New Street, Birmingham, price 2s.; by post, 2s. 4d.

GEO. H. MORLEY, *Secretary.*

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

No more Students can be received in the Major Laboratory until October 27th.

FEES.

Until the October Examination...	£3 3s.
Until the December ,, ...	£7 7s.
Until Qualified (Minor)	£10 10s.
Until Qualified (Minor and Major)	£15 15s.

The next Course will commence on Friday, October 27th.

Students are strongly advised to enter at the commencement of a Course of Lectures. Entries are now being received for October. Gentlemen desirous of attending the next Course of Lectures, should send in their names as early as possible, as there will be only a few vacancies.

There is a prevailing idea among some students that no matter how well they are prepared, a failure is inevitable the first time.

As the principals of this College, we are in a position to state that a great majority of the students who present themselves for examination, fully prepared, do actually pass at their first attempt.—*Vide* the Pass Lists of this College published after each examination.

EVENING CLASSES.

The above Classes have re-assembled, and will be continued through the Session.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(From the Royal School of Mines),

130, CAMDEN ROAD, N.W.

Enclose stamp for terms and particulars.

Laboratory close to Gower Street Station.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. BAXTER, Secretary.

ENGAGEMENTS WANTED.

BY an ASSISTANT. 8 years' experience. Good references. Age 24. Height 5ft. 8½in. J. T., 46, Great Charlotte St., Liverpool.

AS Junior ASSISTANT or DISPENSER. Age 21. Height 5ft. 7in. Can enter at once. Reference to last employer. W. T., 44, Argyle Sq., W.C.

ENGAGEMENTS WANTED.

AS JUNIOR or IMPROVER. In-door. Age nearly 20. Experience in good class Retail and Dispensing. J. S. K., 153, Drake St., Rochdale.

WHOLESALE.—As TRAVELLER or MANAGER OF LABORATORY. Good experience and references. Minor qualification. In or near London preferred. G. H. S., 5, Caroline St., Bedford Sq., W.C.

AS ASSISTANT. In Mixed business. Age 31. Height 5ft. 7in. Home experience. Can give only a father's reference. Salary £30. RALPH DEAKIN, Mr. Geo. Deakin, Chemist, Blaenavon, Mon.

PERMANENT Evening Employment in London, by a gentleman, aged 22, as DISPENSER and BOOK-KEEPER to a Surgeon or Chemist. Excellent references. O. A. W., Mr. Lewis's Medical Library, Gower St., N.W.

IN Wholesale house. Had 6 years' experience in Retail, in Norfolk, and 2 years in an American laboratory. Good references. Please state salary given. MALTINE, Atheldene, Western Rd., Shanklin, Isle of Wight.

JUNIOR or IMPROVER. Age 20. 4 years' experience. London preferred. ALPHA, 11, Gilbert St., Oxford St., W.

AS JUNIOR. West-end experience. Out-door preferred. Age 22. L. L., care of G. S. Boutell, Esq., 52, Marchmont St., Russell Sq., W.

AS ASSISTANT. Minor. Age 24. Tall and of good address. Good London experience and first-class references. Speaks French. Out-door preferred. MINOR, 156, Clapham Rd., S.W.

AS JUNIOR in good Dispensing business. Town preferred. Age 21. Height 5ft. 9in. ALFRED WILLSON, 35, High St., Horncastle.

FOR one or more Evenings, or the whole of Saturday. Minor qualification. H., Mabel House, Clarendon Rd., Walthamstow.

AT liberty early in October.—A competent ASSISTANT. Good references. CHEMIST, 76, High St., Blackpool.

AS ASSISTANT in good Dispensing business. Age 21½. Over 5 years' experience. Good references. Disengaged. J. C. LLOYD, 15, Chelsham Rd., Clapham, S.W.

AS ASSISTANT. In or out-door. London preferred. First-class references and experience. Age 26. Height 5ft. 10in. R. M., 46, All Saints' Rd., Westbourne Park, W.

AS ASSISTANT. Age 23. Height 5ft. 9in. Minor and Hall qualifications. Accustomed to good class trade. Good references. London preferred. T. H., 20, Jocelyn St., Commercial Rd., Peckham, S.E.

AS JUNIOR. In London or suburbs. Age 20. Height 5ft. 6in. 6 years' experience. Address, with particulars, W. R. W., 21, West St., Horsham, Sussex.

AS ASSISTANT, MANAGER, or DISPENSER to Surgeon. Thorough experience. Now disengaged. 3 years' reference from last place. Out-door. Registered. ALPHA, 227, Mayall Rd., Herne Hill.

LOCUM TENENS and TEMPORARY.—R. E. BUNN'S (of 12, Unity Pl., Woolwich) present address is, Mr. Trigg's, Chemist, Barton St., Gloucester. Terms moderate. References and testimonials on application.

AS ASSISTANT in a light Retail business. Minor qualification. Age 24. R. F., 9, Malcolm St., Cambridge.

A GERMAN Chemist's ASSISTANT, aged 26, who has passed his examinations with high praise, and is in possession of the best testimonials from Germany, Switzerland, and Belgium, wants a situation in England. H. C., Avenue du Midi 61, Brussels.

ENGAGEMENTS WANTED.

BY a Registered Chemist and Druggist, who has had over 20 years' good experience, a situation as MANAGER or SENIOR. A., care of Mr. Jones, Chemist, Bromyard.

AS ASSISTANT in a good Retail and Dispensing. Age 22½. Minor and Hall qualifications. First-class experience and reference. T., Bleadon, Weston-super-Mare.

A MINOR Associate, of good experience, studying for Major, wishes to meet with a part time engagement. West-end or Central. JOHN D. TURNEY, 183, Union St., Plymouth.

TEMPORARY. Ætat. 30. By day, week, or month. Thoroughly experienced in all branches of the trade. Irreproachable references. Terms very moderate. A. WOOD, 4, Woodfield Cres., W.

AS ASSISTANT. Temporary or otherwise. Age 30. Height 5ft. 9in. Good experience in all branches, both town and country. Now disengaged. A. G., 9, Probert Rd., Talma Rd., Brixton Station, S.W.

AS ASSISTANT. London or the Continent. Minor qualification. Age 24. Good references. E., 12, Chester St., Mold.

AS JUNIOR, out-door, in London. Good West-end experience. Height 5ft. 8½in. Good references. CROWDER, 23, Bayswater Ter., Bayswater, W.

AS ASSISTANT, in or out-door. Age 25. Varied experience. A. F., 14, Bridge St., Newport, Mon.

MR. A. K. TAYLOR, TEMPORARY MANAGER, is now disengaged. Sole address, 6, Oswald St., Clapton Park, E. Terms, 6s. a day, 35s. a week, and travelling expenses. References forwarded.

AS MANAGER of Branch, or out-door, by Registered Chemist. Married. Great and varied experience. Highest references. F., 8, Upper Aughton Rd., Birkdale, Southport.

LOCUM TENENS.—Mr. W. B. WEST, Staines Rd., Hounslow. 30 years' experience town and country, and unexceptionable references, extending over the last 12 years, as a Temporary Manager.

AS ASSISTANT. London preferred. Ætat 21. Passed Preliminary. Had some London experience. Disengaged Oct. 2nd. CHEMICUS, 251, Gray's Inn Rd., King's Cross, W.C.

AS out-door ASSISTANT or MANAGER. Married. Age 30. No family. Speaks French. West-end experience. ASSISTANT, 14A, Brewer St., Golden Sq., W.

AS ASSISTANT, MANAGER, or TEMPORARY. Age 28 years. Minor and Hall qualifications. Good experience and references. Town or country. Disengaged 25th inst. W. W., 58, Hindon St., Pimlico, S.W.

AS ASSISTANT to a Chemist or Surgeon. Out-door preferred. Good Prescriber. Age 24. A. B., 11, Georgiana St., Camden Town, N.W.

AS DISPENSER to a Surgeon, where time would be allowed for studying for Preliminary. 4 years' experience. W. H. JONES, care of Mr. Lloyd, Chemist, Post Office, Abergele.

AS ASSISTANT in a good business (agricultural preferred). Age 24. Town experience. Good references. Minor qualification. R. G. D., Post Office, Walter Rd., Swansea.

AS LOCUM TENENS.—A gentleman, of long experience in first-class Retail (Ph. Chemist), seeks an engagement for a short or long period. ALPHA, 54, Cotham Hill, Bristol.

RE-ENGAGEMENT as MANAGER. Age 26. Height 6ft. 10 years' experience. French language and pharmacy. Can Extract Teeth. Or would take share in good concern. J. P., Herrings & Co., Aldersgate St.

ENGAGEMENTS WANTED.

AS ASSISTANT in London. In or out-door. 8 years' London experience. Age 24. Height 5ft. 10in. Mr. JOHN SHUTT, Manor House, Shifnal, Salop.

EARLY in October. As MANAGER or ASSISTANT. Out-door. Married, no family. ALPHA, 48, East Hill, Dartford, Kent.

AS ASSISTANT. In a good house, or to Manage. Age 22. Height 5ft. 10in. Good experience. Excellent references. Can Prescribe and Extract Teeth. South of England preferred. J. M. HUMBY, 74, East St., Southampton.

LABORATORY MAN or TRAVELLER. Wholesale Druggists. Have had considerable experience in all kinds of pharmaceutical specialities and steam goods (with or without a view to partner). Good references F. I. C., Mr. Stevenson, 54, High St., Leicester.

AS DISPENSER or ASSISTANT in South of France or Spain. Minor qualification. Highest references. 3 years with first-class London firm. Age 27. S., 7, Suffolk Parade, Cheltenham.

JUNIOR or IMPROVER. Age 20. Height 5ft. 2in. Disengaged. F. B. I., 8, Fort Rd., Margate.

IMMEDIATELY.—As ASSISTANT in Surgeon's Retail, or DISPENSER to Physician. Can Prescribe, Extract Teeth, and Dispense. Good Counterman and Salesman. Unexceptional reference. Age 26. BORAX, 1, Malvern Rd., Hornsey Pk., N.

AS ASSISTANT, in London, with time for study, and small salary. Age 22½. Height 5ft. 4in. 8 years' experience. Good references. J. E. J., 44, Argyle Sq., W.C.

ASSISTANTS WANTED.

AN ASSISTANT for a light Dispensing establishment. One who has passed the Minor examination. State age, salary required, height, &c., to H. B., 6, Montague St., Worthing. Carte if convenient.

DR. SARGENT, Dorrell Pl., Brixton Railway Station, London, requires an ASSISTANT, able to Extract Teeth, Dispense, and attend an ordinary Chemist's Retail. Hours of business, 8 a.m. till 9 p.m. Sundays, 6 p.m. till 9 p.m.

GAINSBOROUGH.—An in-door ASSISTANT. One accustomed to a good Family and Dispensing trade. Apply, stating age, salary and reference, to R. TEBBS, Chemist, Market Pl., Gainsborough.

AN ASSISTANT, unmarried, in a country business, in an agricultural district. Comfortable home. No Sunday duty. Address, stating salary required, experience, reference, age, and when disengaged, enclosing carte, if convenient, to R. CALVERT, Chemist, Stokesley, via Northallerton.

APPRENTICE.—A vacancy for a well-educated youth in a good class Dispensing business. One who has passed or is prepared for the Preliminary preferred. Moderate premium. Apply, J. D. HARMER, Chymist, Windsor.

AN ASSISTANT. Age about 28. Must be a good Counterman and Prescriber, thoroughly steady, with good references. Address, with full particulars, to G. M., care of R. M. Rew & Co., 273, Regent St., W.

IMMEDIATELY.—A competent ASSISTANT, not under 23. Apply personally. G. J. KNIGHT, 452, Edgware Rd., W.

IMMEDIATELY.—A Junior ASSISTANT. Good Dispenser and Counterman. Apply personally, or send photograph with usual particulars, to J. H. LEWIS, 22, Great Portland St., Oxford Circus, W.

ASSISTANTS WANTED.

SEPTEMBER 29th.—A steady and trustworthy ASSISTANT, of good address, not less than 25 years of age. Out-door, except dinner and tea. Must be a good Salesman and Dispenser. One seeking a permanent situation preferred. State age, height, salary, and previous engagements, and enclose carte. CHARLES MUMBY & Co., 47, High St., Gosport.

PARIS. — Immediately.—A competent Dispensing ASSISTANT. Must speak French fluently. Apply personally, or by letter with photo., to PHARMACIEN, care of Messrs. Maw, Son & Thompson, Aldersgate St., E.C.

IMMEDIATELY.—A competent ASSISTANT for a Dispensing and light Retail business. Apply, with usual particulars, and enclose carte (to be returned), to Messrs. LONG & STRICKLAND, Bognor-on-Sea, Sussex.

FOR a good class suburban Dispensing business, where 1 assistant only is employed, a gentlemanly ASSISTANT, with Minor qualification, who has had some experience in a good house. Full particulars, with carte, and salary required, to H. C. BIRCH, Pharm. Chemist, Upper Norwood, S.E.

MR. F. WARREN SMITH (late Manning & Son), 7, High St., Yeovil, has an immediate vacancy for an ASSISTANT, out-door, not under 21 years of age, and capable of taking charge in absence of principal.

A COMPETENT ASSISTANT in a West-end Dispensing business. About 22. One passed Minor preferred. Usual particulars and latest references, D. GUNN, James St., Westbourne Ter.

IMMEDIATELY.—In an inland watering place. A qualified ASSISTANT. Of gentlemanly appearance and address. Accustomed to the routine of a first-class business. 3 assistants kept. Address (enclosing carte), giving age, height, salary required, and references, M. M. N., care of Messrs. Hodgkinsons, 198, Upper Whitecross St., E.C.

ASSISTANT. In general Retail and Counter trade. In-doors. Hours, 8.30 to 8 o'clock. No Sunday duty. Apply, stating age, height, and salary, also how long in last situation, and reference, J. H. & S., 33 Beech St., London, E.C.

BY the end of September.—A well conducted ASSISTANT, for a permanency. From 22 to 25. Must be recommended by last employer for sobriety, and to be of industrious habits and agreeable manners. Apply, enclosing photograph (to be returned), stating full particulars and salary required, to D. PROSSER, Sheerness, Kent.

A JUNIOR ASSISTANT. In-door. Just out of his time preferred. For a Mixed country business. One willing to make himself useful. None other kept. Apply, stating age, height, salary required, and reference, with photo., if possible, to J. DAY, Chemist, Savile Town, Dewsbury.

LEICESTER Provident Dispensary.—An ASSISTANT is required, principally for work in the Laboratory, but likewise to assist about two hours a day in Dispensing. Particulars of duties and salary may be obtained on application to the undersigned. No application will be answered that is not received on or before the 30th inst.
Sept. 20th, 1882. W. DALRYMPLE, Secretary.

AT once.—An English ASSISTANT at a first-class Chemist's in Paris. Knowledge of French not indispensable. Apply to Mr. GÔIFFON, 16, Coleman St., E.C.

SOUTH Coast.—A Junior ASSISTANT for first-class Dispensing business. Apply, with full particulars, to J. F., care of Messrs. Barron & Harveys, Giltspur St.

A QUALIFIED ASSISTANT, about 25 years of age. Apply, enclosing photograph and reference, and stating age and height, to R. A. SAUNDERS, 1, Mutley Plain, Plymouth.

ASSISTANTS WANTED.

MESSRS. TOWNSON & CO., Bowdon, near Manchester, are in immediate want of an ASSISTANT.

IMMEDIATELY.—A thoroughly pushing business YOUNG MAN, 23 to 25 years, for a general country and agricultural trade. One accustomed to drive, and solicit amongst Farmers, &c. Must have a reliable character, and have good business abilities. Total abstainer and Wesleyan preferred. Photo. and full particulars to H. PAYNE, Market Rasen, Lincolnshire.

AN ASSISTANT, about 22. In-doors. In a Mixed country business. Must be a good Counterman and Dispenser. No Sunday duty. Apply, stating salary required, and send photo., to J. WELLINGTON, Chemist, Oakham.

AN out-door ASSISTANT. Age about 24. One with Minor qualification and an abstainer preferred. BALKWILL & Co., Pharmaceutical Chemists, Plymouth.

EARLY in October.—A steady trustworthy JUNIOR, of good appearance and manners, accustomed to country trade, and a neat and careful Dispenser. Churchman preferred. Apply, stating age, height, salary (in-doors), and references, to T. BROWN, Pharmaceutical Chemist, Lutterworth, Leicestershire.

JUNIOR ASSISTANT, in-door, about 20 or 21, for a general Retail and Dispensing trade. Abstainer preferred, and unexceptionable reference required. Address, stating age, height, salary, &c., to A. B., care of Mr. Henry George, Priory, Newark, Notts.

OCT. 5.—A gentlemanly ASSISTANT, about 24, used to first-class Dispensing business. Good writer. Bedroom found, but not board. Apply, with carte and usual particulars, JAMESON & CURTIS, Hastings and St. Leonards.

AN ASSISTANT, accustomed to both Chemist's and Grocer's business, and willing to travel if required. Apply, stating particulars, to C. PARKER, Chemist, Kirkby Lonsdale, Westmorland.

IMMEDIATELY.—An ASSISTANT, age about 23, of gentlemanly appearance and address, for a light Retail and Dispensing business, where 1 only is kept. Preference given to one with London experience. Apply personally, or by letter, with full particulars, to Z., 164, High St., Notting Hill, W.

IMPROVER, TURNOVER, or JUNIOR, required immediately, or an ASSISTANT requiring time for study, in a light Retail near Bloomsbury Square. Address, with full particulars of terms and references, and enclosing carte if convenient, to NEMO, Messrs. Hodgkinson & Co., Upper Whitecross St., E.C.

BY Oct. 20 (where another is kept), a competent ASSISTANT. Age about 23 years. Minor or Hall qualification. Experienced Dispenser. Good writer. Hours 8 to 8.30. Allowed 1 evening a week and whole of every other Sunday. Salary £45. Useless to write. Must apply personally, mornings 10 to 12, evenings 6 to 8. D. WHITE & SON, 19, Park Ter., Regent's Park.

AN ASSISTANT, qualified, with view to Partnership and succession, in small town. Good house, large garden. Established by Proprietor 30 years. Has realised competency. He must have £400, be industrious and steady, and accustomed to country business. State own views fully, to I. 227, Wyleys & Co., Coventry.

IMMEDIATELY.—Junior ASSISTANT DISPENSER. One who has had experience in Hospital Dispensing or been engaged with a Medical Practitioner preferred. Salary £25, with board and residence. Hours short. Practical Chemistry, and access to Materia Medica cabinet free. Candidates must state age and usual particulars, with copies of testimonials, to the HEAD DISPENSER, Royal Infirmary, Bristol.

Sept. 20th, 1882.

ASSISTANTS WANTED.

IMPROVER. — An industrious, intelligent YOUNG GENTLEMAN. Must be obliging and possess some knowledge of Retail Chemist's business. Comfortable home. Time allowed for study, and assistance given. Opportunity would also be afforded for acquiring a knowledge of Dentistry. If convenient enclose carte. J. REDFERN, Chemist, 12, Argyle St., Bath.

HOMŒOPATHY.—An ASSISTANT, fairly competent to Dispense, &c. Address, R. W. & Co., Homœopathic Chemists, 121, Western Rd., Brighton.

IMMEDIATELY.—An ASSISTANT, accustomed to good Retail and Dispensing. State salary, qualification, height, and reference. Enclose carte, to be returned. CHEMICUS, 5, Blandford St., Portman Sq., London, W.

ASSISTANT for Dispensing and light Retail business. Must be good writer. References and character must bear full investigation. Applications not answered in 3 days to be considered as declined. Usual particulars to S. J. COLEY, Chemist, Stroud.

JUNIOR ASSISTANT. Minor qualification and some knowledge of Chemical apparatus desirable. Apply, with full particulars, to M. B., care Mr. W. Edwards, 157, Queen Victoria St., London.

J. L. DENNIS, Chemist, Nottingham, has a vacancy for an APPRENTICE. Exceptional facilities offered for acquiring a good knowledge of Dispensing and general routine of a Mixed business, combined with comfortable home. Nottingham University College is open for students. An IMPROVER or JUNIOR also required.

JUNIOR or IMPROVER in a light Retail and Dispensing business. Time allowed for study. Good references required. Apply F. SWIFT, 33, Chatsworth Rd., Clapton Park, E.

IMMEDIATELY.—A competent ASSISTANT. Must be reliable Dispenser and of good appearance and address. Apply with carte (which will be returned), and full particulars to save time, to WALTER WRIGHT, 47, High St., Exeter.

AN ASSISTANT, not under 23. Competent, trustworthy, and a good and correct Dispenser. Apply, stating age, previous engagement and salary required, to E. POORE, Chemist, Broadstairs. Parties not receiving a reply within 4 days will consider their application declined.

A JUNIOR ASSISTANT, for about a month, commencing at once. W. WYLES, New Bridge, Dover.

BUSINESSES FOR DISPOSAL.

A HANDSOMELY fitted Chemist's SHOP. In a pleasant suburb, London, N. Carried on by Assistant, at full prices. Good house, with accommodation for family, and principal part of rent let off on 3 years' agreement. Lease 21 years. Price £800 cash. Address, CHEMICUS, Messrs. Newbery's, Newgate St., London, E.C. No agents.

RETAIL and Prescribing BUSINESS. In an improving and populous neighbourhood. No heavy trade. 50 per cent. profit. All ready-money. Shop beautifully fitted and well stocked. Double front with plate-glass. Good house, with side entrance. Thorough investigation allowed. Price £400. NEWCOMBE, Chemist, Bedminster, Bristol.

CHEMIST'S BRANCH. S.E. Unopposed. In vendor's hands 14 years. Surrounded by 1000 new houses, erected within 2 years. Good house. Easy rent. Shop neatly fitted. Decent stock. Tenant entitled to Dulwich College privileges. Plenty scope for energetic man who could work up neglected business. Price low. 371, Commercial Rd., E.

BUSINESSES FOR DISPOSAL.

SUFFOLK.—A first-class Dispensing and Prescribing BUSINESS. Well established. Good cash returns. Excellent house. Shop well fitted and in the best position. Address, H. K., Messrs. S. Maw, Son & Thompson, 7 to 12, Aldersgate St., E.C.

LONDON, S.W.—Branch BUSINESS. In first-class neighbourhood. Price very moderate. Returns about £400. Rent £50, on lease. £35 let off. Apply to C. ROBINSON, Chemist, Upper Streatham, S.W. No agents.

CARDIFF.—Goodwill and Stock of Chemist and Druggist, with good house and premises. Situated in the principal business street in the important town of Cardiff. The business to be disposed of in consequence of declining health of present proprietor. Address, Mr. C. H. SMITH, Rhondda Chemical Works, Pontypridd, Glamorganshire.

AN old established light Retail and Dispensing BUSINESS. Well situated in the principal street in a large town in Lancashire. Large shop, handsomely fitted. Returns £1500, with good profits. Price £1200, or valuation and goodwill. Every facility will be given for thorough investigation. M. P. S., Mr. Brett, King St., Leicester.

GOOD class Country RETAIL, with fair amount of Dispensing. Survey. Returns about £1500. Price less than 1 year's returns. This is a thoroughly reliable business, and can be proved. Only buyers with references will be answered. S. H., care of Burgoynes & Co., 16, Coleman St., E.C.

IN a Midland County Town.—Light Retail, Prescribing, and DISPENSING. Carried on successfully for last 9 years by present occupier. Good profits. Capital opening for Dentistry. Reason for disposal, ill-health. Large and comfortable house. Returns nearly £600. Price £450. Apply, A. H., Messrs. Gabriel & Troke, 82, City Rd., London.

MANCHESTER.—Rising suburb on the main road. Light Retail, Prescribing, and Dispensing BUSINESS. Well fitted and stocked. Commodious house. Rent £26. Average returns £320. No other chemist for half a mile. Satisfactory reasons given. Investigation courted. Good opening for a Dentist. Address, ALPHA, Hirst, Brooke & Hirst, Wholesale Druggists, Leeds.

MR. HINE GILBERT has for sale :—A high class BUSINESS. Near London. Good house and garden. Returning £1000 per annum, at full prices. It will bear every scrutiny. Price £700, a portion of which may remain. Full particulars, as also of many others, at 17, Hart St., Bloomsbury Sq.

MESSRS. GURDEN BERDOE have for transfer:—WEST OF ENGLAND. Good class Business. Showing £600 net profit. Good house. Garden. £2000. DEVON. High class Dispensing Trade. Returning £1350. Through illness. £1200. ESSEX. Unopposed. 5 miles from the sea. Rent £30. Good house and garden. Returning £750. For £700. SUFFOLK. Good class trade. Full prices. Returning nearly £1000. Splendid house, garden, and vinery. £700. KENT. Easy distance of town. Retail, Dispensing Trade. Returning £600. Full prices. Good house. £450. Should be seen. Another. Totally unopposed. Returns average for last 5 years, £800. Books seen at our offices. Only £400, or offer. Through serious illness. LONDON, N. Rapidly increasing suburb. Main road. Opposite railway station. 2000 houses to be built opposite. Returning now £500. Well fitted and stocked. £350. N.W. Genuine Retail. Returning £550. Totally unopposed. £500. N.E. Under junior last year as a branch. Returning £6 weekly. Only £150. SURREY. 15 miles out. Through illness. Same hands 10 years. Nothing heavy. Returning £7 weekly. Only £65. Please apply, 30, Jewry St., Aldgate, City.

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CHEMISTS.—An excellent start in life for any young man in possession of £200 to £300. Succession to unopposed cash RETAIL. London suburb. Certain to lead on to a large fortune. OZONE, 114, Victoria Rd., Westminster, S.W.

AN established BUSINESS at Milnthorpe, Westmoreland. Light Retail and Dispensing. No opposition. New fittings. Easy purchase. Good house. Full particulars on application to Mr. C. PARKER, Chemist, Kirby Lonsdale.

IMMEDIATELY.—Proprietor going abroad. Genuine old established ready-money BUSINESS in Norwich. Central position. Improving neighbourhood. Good house. Returns from £500 to £600. Profits about half. Rent, rates and taxes moderate. Goodwill nominal. Stock, &c., at valuation. Address, MASONIC, care of Messrs. Smith & Sons, Magdalen St., Norwich.

S. W.—Genuine bargain. £230 cash or £50 and valuation. Retail Dispensing and PRESCRIBING, with excellent scope for Dentistry. Average takings £10 weekly. Fair profits. Rent and taxes low. Good house and position. A week's introduction if taken to at once. No agents. BETA, 'Western Mail' Offices, Cardiff.

LIVERPOOL.—A bonâ fide light Retail and Dispensing BUSINESS. Good position. Populous neighbourhood. Corner shop. Plate-glass fronts. Average returns £10 per week, at full prices. Satisfactory reasons for disposal. Further particulars, address by letter only (no agents), CHEMICUS, Mr. Hughes, 25, Monastery Rd., Anfield, Liverpool.

MESSRS. TENCH & TAYLOR

Licensed Valuers and Agents,

WALBROOK CHAMBERS, 38, WALBROOK,

LONDON, E.C.

Have the following businesses for disposal. Further particulars and orders to view can be had on application:—

1. LONDON (Southern Suburb).—Dispensing and light Retail BUSINESS. Returns average about £1000 per annum. Price £950.
2. LONDON, N.E.—Dispensing, Prescribing and RETAIL. Returns £342, and increasing, at good profits. Rent £30. Price £350.
3. SOMERSETSHIRE.—Light Retail and DISPENSING, with Dentistry. Returns £550. Rent £50. 12-roomed house. Price £500. Open to a reasonable offer.
4. HERTS.—Dispensing, Prescribing and general RETAIL. Returns over £400. Rent £35. Valuation—about £300.
5. HANTS.—Light Retail, Prescribing and DISPENSING. Returns £470. Gross profits more than half. 15 years' lease. 9-roomed house. Price £400.
6. LONDON, W.—Retail, Dispensing and PRESCRIBING. Very profitable. Returns about £6 weekly, and steadily increasing. Price £325.
7. DERBYSHIRE.—Light Retail BUSINESS, with a little local Wholesale. Returns last year £1313. Rent only £50. Price £700. Part can remain. This is a bargain.
8. SUSSEX.—Retail, Dispensing and PRESCRIBING, with a little Agricultural Medicines. Returns average nearly £700 per annum. Gross profits about half. Price £550. Part can remain.

Gentlemen seeking investments are respectfully requested to apply to Messrs. T. & T. for their PRINTED REGISTER, which contains particulars of about 200 other businesses, ranging in price from £80 to £2500.

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Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

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Member of the Pharmaceutical Society,

Chemists' Transfer Agent and Valuer,

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Applications for either purchase or sale of businesses inserted in Register free of charge.

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Z.	Net profits £500.	Price £1400.
2.	„ „ £650.	„ £1800.
7.	Returns £600.	„ £550.
8.	„ £650.	„ £600.
11.	„ £150.	„ £70.
14.	„ £400.	„ £350.
15.	„ £150.	„ £150.
16.	Net profit £300.	„ £600.
28.	„ „ £400.	Valuation.
29.	„ „ £200.	Price £300.
31.	Returns £260.	„ £250.
32.	Net profit £110.	„ £250.
34.	„ „ £600.	„ £1600.
35.	„ „ £200.	„ £350.
36.	Returns £500.	„ £250.
37.	„ £10 10s. per week.	Price £400.
38.	Net profit £75.	Price £130.
39.	Returns £9 per week.	Price £250.

Particulars of these and other businesses on application, per post or otherwise.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

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2. LONDON, S.W.—Retail and DISPENSING. Returns £400. Good house, very low rental. Price about £350.
3. ST. JOHN'S WOOD.—Retail and Dispensing BUSINESS. Good position. Handsome shop. Returns £550. Large house. Rent £60, on lease. Price about £500.
4. Watering Place, SOUTH COAST.—Handsome shop. First-class Retail and DISPENSING. Returns £1000. All full prices. Price about £1000.
5. SOMERSET.—Vendor retiring from business. Mixed TRADE (not heavy). Gross returns £1300 yearly. Valuation only. No premium required for goodwill.
6. UNIVERSITY TOWN.—First-class Retail and DISPENSING. Full prices. Returns £900 yearly. Price about £900. Full investigation.
7. YORKSHIRE.—Death vacancy. Retail and Dispensing BUSINESS. Returns £600 yearly. Price about £500, or valuation.

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600 CASES for sale, in excellent condition. Quarts, 20/-, Pints, 30/- per case. Liberal discount for quantity. T. S. DAY & Co., Herne Hill, S.E.

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CHEMIST'S complete Stock and Fittings: Bottles, Drawers, Counters, Cases, Lamp. Sufficient to fit out a nice shop. Apply, J. H. NOYCE, Broughton, Winchester.

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THE Stock, Fittings, and Fixtures of a Chemist's Shop. The fixtures are of mahogany, the bottles and jars of modern shape, and are all in good condition. Can be seen by appointment. Apply to Mrs. KENT, Shirehampton, Bristol.

FIVE GOLD MEDALS AWARDED.

We have received the following letter from Dr. Josiah Williams, which we have much pleasure in publishing:—

"ANOTHER SEVERE TEST."

Messrs. John Richardson & Co., Leicester.

Sheffield, June 22nd, 1882.

Gentlemen,

I have just returned to Sheffield after six months' travel through Italy, Egypt, Central Africa, and Abyssinia, and knowing that you have a very large trading connection abroad, I am induced to send you the following particulars of the excellence of your Pearl-Coated Pills.

I took with me over 30 gross of various Formulæ of your Coated Pills, and they were subjected to the following severe tests of temperature:—We were three weeks in crossing the Desert from Suakin to Kassala; the first day was a journey of the most unpleasant nature through torrents of rain: this found its way into the Medicine Chest, making the straw in which the medicines were packed very damp; after this, the heat was excessive every day (Solar Thermometer 150° Fah.), causing the interior of the chest to be quite hot and steamy for a day or two. In passing through the Kunama Country up to Abyssinia the temperature at mid-day was 100° Fah. in the shade, sinking by 10 p.m. to 37°. Later on, whilst amongst the Hamram Arabs, we had the temp. as high as 106° in the shade, but notwithstanding this immense variation of temperature, I found your Coated Pills perfect in every particular, not one of them cracked or discoloured.

It affords me the greatest possible pleasure to communicate the above testimony, and beg of you to make any use you may deem desirable of my experience.

I am, Gentlemen, yours very truly,
JOSIAH WILLIAMS.

Now ready, the *Eighth* Edition of our Price List, containing nearly 700 Formulæ, with a Therapeutical Index. By Dr. A. WALLACE. Post free on application.

FIVE GOLD MEDALS *awarded for the elegance and superiority of our* PEARL-COATED PILLS *over all others at the Great International Exhibitions.*

WE ARE THE LARGEST MAKERS IN THE WORLD.

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London: Printed by WILLIAM INGLIS RICHARDSON, 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. CHURCHILL, 11 New Burlington Street.

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Pharmaceutical Society of Great Britain,
17, BLOOMSBURY SQUARE, LONDON.
ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, October 4th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The Sessional Prizes and Certificates will be distributed at this Meeting. Successful Candidates will be expected to attend. An Address to the Students will be delivered by JOSEPH INCE, F.C.S., F.L.S. *All Students and friends, ladies and gentlemen, are invited to be present.*

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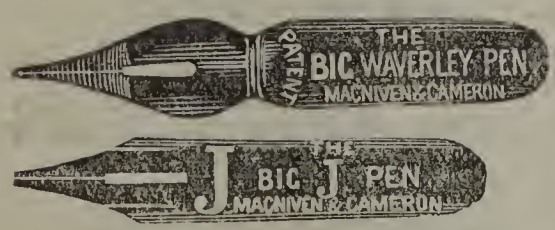

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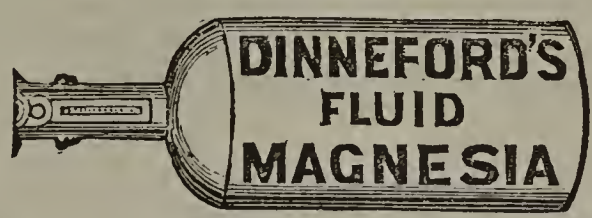

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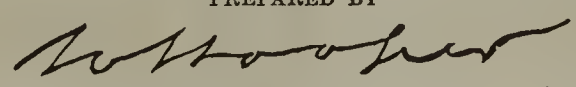

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R. HAMPSON prepares the Pills of the Pharmacopœia, and a great variety of Pills from useful formulæ. The Pills are made of the best ingredients, and being *quickly* diffusible always give satisfaction. A Price Current and sample post free. Supplied direct or through the Wholesale Houses. Special quotations for large quantities.

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Who offer the finest pale steam refined COD LIVER OIL, in original 25 gallon tin-lined casks, and can now supply Rectified Spirits of Wine in quantities of two gallons and upwards.

FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XIII.

TASTELESS PILLS
(COX'S PATENT.)
Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

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Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

BENGER'S PREPARATIONS.

These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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BENGER'S PEPTONISED BEEF JELLY—May be taken by teaspoonfuls as a quick restorative, or used to fortify ordinary beef-tea, soups, &c. Tins, 2s. each.

BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

Of all leading Wholesale and Retail houses.

MANUFACTURERS:
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EXTRACT OF MEAT,

According to analysis, is the best. Prepared at the Company's own Works, Santa Elena, South America. Sole Agents, ROCKWOOD & Co., 12, Long Lane, E.C. Agents required.

Dr. ARTHUR HILL HASSALL, M.D.: "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

Mr. CHARLES H. PIESSE, F.C.S., Public Analyst:—"As the result of my careful examination of the Extract of Meat (E. Kemmerich & Co.), I find it to be absolutely pure. It contains a very large percentage of solid constituents o Meat. The nutritive value is of the highest order."

CONROY'S
MALT COFFEE.

The *Globe* says:—"There are, we know, several so-called 'coffees' whose disappearance would be no loss to the British public. These are, for the most part, coffee only in name, a very small portion of the fragrant berry being mixed with ingredients which have no sort of claim to public favour. MALT COFFEE, on the contrary, should be both wholesome and invigorating, if the constituents are what the name implies. Each is beneficial in its own way to the human constitution, and the combination ought, therefore, to improve the health of those who consume it."

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Contains about 75 per cent. PURE COFFEE.
Malted by a Patent Process.
Consists solely of Coffee and Malt.
Flavour equal to finest Coffee.
Doctors recommend it.

Contains all the valuable principles of Malt.
More nutritious than Beer or Porter.
Causes no unpleasant eructations.
Promotes sound and healthy digestion.
Breakfast Beverage par excellence.

IT IS MADE IN THE SAME WAY AS ORDINARY COFFEE.

PAMPHLETS CONTAINING TESTIMONIALS FROM EMINENT SCIENTIFIC, MEDICAL, and OTHER GENTLEMEN OF THE HIGHEST POSITIONS, MAY BE HAD FREE FOR GRATUITOUS DISTRIBUTION.

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QUOTATIONS ON APPLICATION.

SPRATTS PATENT

Meat "Fibrine" Vegetable **DOG CAKES** (with Beetroot.)

DOG AND POULTRY MEDICINES AND DOG SOAP.

TO CHEMISTS AND DRUGGISTS.

Transparent Glass Tablets for Medicines and Soap supplied on application, or through Wholesale Houses.

Address "SPRATTS PATENT," Bermondsey, S.E.

Or Order through your Wholesale House.

UMNEY'S

Lancet.—"An excellent preparation; contains all the alkaloids of the Bark."

Medical Times and Gazette.—"An excellent, elegant, reliable and very convenient preparation."

Medical Press and Circular.—"Used in hospital and private practice with the most satisfactory results."

Pharmaceutical Journal.—"Excellent preparation, furnishing the constituents of the Bark in a concentrated form."

Chemist and Druggist.—"Pharmaceutically worthy of the valuable medicine which it represents."

At Medical International Congress, London, the Indian Bark was declared to be the Bark of the future.

Extensively used in private and Hospital practice, on account of its ELEGANCE, MEDICINAL VALUE, and MODERATE COST.

FLUID EXTRACT OF CINCHONA.

Made from Bark of Cinchona Succirubra, as grown in Government Plantations of British India.

See opinions of Medical and Pharmaceutical Press, and testimony as to its superiority over all other Fluid Preparations of Cinchona.

Price 10/6 per lb.

To be obtained of all Druggists (Wholesale and Retail) in the United Kingdom.
In ordering, specify "UMNEY'S."

WRIGHT, LAYMAN & UMNEY,
SOUTHWARK, LONDON, S.E.

TONGA—IMPORTANT NOTICE.

REDUCTION IN PRICE.

ALLEN & HANBURYS are glad to state that they have been able to make arrangements for an important reduction in the price of TONGA.

On and after November the 1st the present 4/6 size will be reduced in price to **2/9**, and larger sizes will be put up at 4/6 and 11/-. None of the new sizes will be issued until November 1st. During November all stocks of the old sizes on hand can be returned **through the house from which they were bought**, and will be credited or exchanged for an equivalent value in the new sizes.

THE FOLLOWING WILL BE THE WHOLESALE PRICES:—

2s. 9d. size 28s. per doz.; 4s. 6d. size 46s. per doz.; 11s. size 114s. per doz.

SUBJECT TO THE USUAL DISCOUNTS.

SILVER MEDAL, PARIS, 1878.

REVISED PRICE LIST OF JUJUBES

A. & H. MARK, A.D. 1715.

TRADE

Prepared by Patent Process.

	1-lb. size.	1/- size.	6d. size.
ANISEED LIQUORICE....	Per doz. 30/-	Per doz. 8/-	Per doz. 4/-
BLACK CURRANT	,,	,,	,,
DELECTABLE	,,	,,	,,
EXTRACT OF MALT	,,	,,	,,
GLYCERINE.....	,,	,,	,,
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LIQUORICE	,,	,,	,,
MAGNUM BONUM	,,	,,	,,
PECTORALE	,,	,,	,,
PINE (Pâte de jujube)	,,	,,	,,
RASPBERRY	,,	,,	,,
ROSE	,,	,,	,,
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JUJUBES 2/- per lb. or in tin boxes.

	1-lb. size.	1/- size.	6d. size.
	Per doz. 32/-	Per doz. 8/6	Per doz. 4/4
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PASTILLES 2/2 per lb. or in tin boxes.

All the above tins are neatly wrapped ready for sale. The One Pound Tins are returnable at 6/- per dozen.

GUIMAUVE, cut into Cubes GUIMAUVE PASTILLES..	2/6 per lb.	36/-	8/-	*not supplied.*
GUIMAUVE SHEETS	2/- ,,			

GUIMAUVE PASTILLES (Crystallized)....2/6 per lb.
,, ,, (Rose) .....2/6 ,,
} The Two can be had mixed.
CRYSTALLIZED FRUIT PASTILLES ....2/- ,,
CRYSTALLIZED VOICE JUJUBES .....2/- ,,
Various, assorted or mixed.

PECTORAL FRUIT PASTILLES.

(REGISTERED.)

A bronchial and pulmonic Jujube of delicious flavour.

Sold only in round boxes to retail at 1/-, 1/9, and 3/- each; 9/-, 16/-, and 27/- per doz.

MEDICATED THROAT PASTILLES.

Prepared as originally suggested by Dr. PROSSER JAMES.

Lecturer on Materia Medica and Therapeutics, London Hospital; Physician to the Hospital for Diseases of the Throat, &c.

1.—**Morphia.** ($\frac{1}{40}$ of a grain.)

2.—**Ipecacuanha.** Are readily taken by children. These pastilles are of the same strength as the B.P. lozenges.

3.—**Morphia and Ipecacuanha.** ($\frac{1}{40}$ grain Morph., and $\frac{1}{4}$ grain Ipecac.)

4.—**Compound Morphia and Ipecacuanha.** A more active remedy than No. 3. ($\frac{1}{40}$ grain Morph., $\frac{1}{5}$ Ipecac., $\frac{1}{5}$ Squill, &c.)

5.—**Opium and Belladonna.** An agreeable substitute for the Torch: Opii B. P., and of the same strength.

6.—**Aconite.** Each Pastille equivalent to half a drop of the B. P. Tincture.

7.—**Compound Camphor or Voice.**

8.—**Chlorate of Soda.** May be taken whenever the throat is uneasy.

9.—**Lithia.** An agreeable mode of taking this alkali. Each pastille contains 1 grain.

10.—**Benzoated Voice.** Useful to public speakers, &c. Less active than the Compound Camphor, No. 7.

11.—**Chlorate of Potash.** A more agreeable form than the lozenge of the Pharmacopœia.

12.—**Chalybeate.** (Pastilli Ferri., A. & H., 1 grain Citrate of Iron.) An agreeable form of lozenge, readily taken by children.

13.—**Krameria.** Containing 2 grains of Extract in each.

14.—**Tannic Acid.** Containing $\frac{1}{2}$ grain in each.

These Pastilles are supplied in 1-lb. Bottles at **36/-** per dozen, the Bottles returnable at **6/-** per dozen; and in Boxes containing three ounces, to retail at **1/-** each, **8/-** per dozen.

CIRCULARS SHOWING DOSES, &c., for DISTRIBUTION AMONGST MEDICAL MEN SUPPLIED on APPLICATION.

ALLEN & HANBURYS, Plough Court, 37, Lombard Street, LONDON.

"THE MONTH."

Autumn is undoubtedly the best time to study the structure of fruits, more being then available for the purpose than at any other period of the year. The scarlet berries of the bryony, dulcamara and mezereon, and the still more specious fruits of the yew, as well as the cherry-like fruit of the deadly nightshade (*Atropa Belladonna*), are just such as would tempt the eye, and it is scarcely a matter of surprise that they should be picked and eaten by young children. In the *British Medical Journal* (p. 521) a case of poisoning by mezereon fruits is recorded, the patient being a little girl, two and a half years old, living at Maidstone, who seems to have eaten about fifty of them. After the administration of emetics and castor oil (the former of which did not cause the ejection of the seeds), the application of mustard to the chest, and the use of ammonia and brandy internally, she evacuated the seeds and recovered next day. The case possesses some interest as six to twelve berries have been considered a fatal dose, and the narcotic symptoms which formed a marked feature in this case have been disputed. A somewhat similar case of poisoning lately occurred at Plumstead in the same county, a little boy two years old having eaten some berries supposed to have been collected in the next garden. The medical man who saw the child found him suffering from inflammation of the stomach and intestines, "due to some irritant mineral poison." After a *post-mortem* examination death was attributed by the same medical man to the deceased having eaten some of the berries. These were said by the coroner to be belladonna berries; but the *British Medical Journal* doubts whether this plant is likely to have been found in a garden and suggests the *Solanum nigrum* or *S. Dulcamara*. It seems strange that the medical man should not know belladonna when he saw it, yet it can scarcely be called an irritant poison. The frequent mistakes which occur concerning this plant and the hemlock water dropwort seem to suggest that a practical knowledge of our indigenous poisonous plants, as well as of the commoner garden species, does not form so prominent a feature in botanical lectures as it should do.

At this time of the year orchids with green or white flowers seem to be the predominant species. The musk orchis, *Herminium monorchis*, the *Spiranthes autumnalis* (both with greenish-white flowers and fragrant towards the evening), and the *Habenaria viridis* are not unfrequent in pastures, but probably often overlooked. Another species, also with green flowers, *Malaxis paludosa*, probably often escapes notice from occurring in spongy bogs where it is dangerous to tread, but when found the curious gemmæ on the leaves are worthy of notice. The *Spiranthes* has, for the size of the plant, remarkably large tubers, which would probably make as good salep as the Indian kind.

At the Botanical Gardens at Regent's Park, one or two interesting economic plants may be seen in fruit. That of the star-anise, in which the carpels are erect in the centre of the flower when in blossom, may now be seen extended with the follicles occupying a horizontal position. The smooth fruits of *Croton Tiglium*, in the Economic House, present a marked contrast to the prickly fruits of the castor oil plant, which more resemble externally the thorny "apple" of the *Stramonium*. *Adenanthera pavonina* is also in fruit, and will afford an opportunity of watching the change of the seeds from green to the brilliant red colour which characterizes them. The sensitive plant, *Mimosa pudica*, is now decked with heads of flowers of a delicate lilac hue, and the jaborandi (*Pilocarpus pennatifolius*) is putting forth fresh flowering spikes.

At Kew the Economic Beds still present a number of medicinal plants in blossom, among which are conspicuous the pinky-white flowers of the scammony plant, while the violet-blue ones of the alkanet and the sky-blue of the borage are in close contrast; peppermint, lavender, horehound, chicory, safflower, hemp, and many others, also continue in flower. The barren terminal bracts of *Salvia Horminum* seem to concentrate in themselves all the colouring matter of the plants, and if colour serves to attract insects it is difficult to understand why they should present so conspicuous a purple, while the small, almost white, flowers might easily be overlooked.

In the country the colchicum should be in full blossom, enlivening the damp pastures, to which it is partial, by its brightness of colour. The camomile is abundant on damp grassy commons and the hop hangs its graceful festoons on the hedgerow. The catmint, too, with an odour which has been likened to that of some of the cages at the Zoological Gardens, is now in blossom on chalky banks.

Of roses the name is legion, and it requires some little courage to attempt the feat of mastering the distinctive features of even the British species. A new variety of a species of this intricate genus has recently been discovered by Mr. George Nicholson, Assistant Curator of Kew Gardens, at St. Cyrus, Kincardineshire. It has been named by M. Crepin, in compliment to the discoverer, var. *Nicholsoni* of *Rosa subauda* (*Gardeners' Chronicle*, p. 272).

The new British umbellifer, *Selinum carvifolium*, mentioned as having been discovered in Lincolnshire, has now been met with in great quantity, and undoubtedly wild, in Cambridgeshire, by a young botanist named Cross (*Gardeners' Chronicle*, p. 276). It is satisfactory to know that the plant may therefore be accepted as a native of Britain; probably a species so easily overlooked may yet be found in some of the other eastern counties of England.

Another new British plant has recently been discovered, viz., *Lycopodium complanatum*. This plant, which had previously been found as near this country as Belgium, was met with in heathy ground in Gloucestershire. Except in its compressed frond and procumbent habit, it bears considerable resemblance to *L. alpinum*, for which it might perhaps be overlooked. A figure and full account of the plant are to appear, it is said, in the forthcoming number of the *Journal of Botany*. Several other interesting discoveries have also been made recently, *e.g.*, the occurrence of *Eriophorum gracile* in the New Forest, and also *Isnardia palustris*, in tolerable abundance.

In *Nature* (p. 477), Dr. Schaarschmidt Gyula corrects a statement of Professor Pringsheim concerning the occurrence of hypochlorin in the *Bacillariaceæ* and *Cyanophyceæ*. Dr. Gyula says that he has with the use of hydrochloric acid found hypochlorin in all the *Bacillariaceæ* and *Cyanophyceæ* investigated, the experiment having succeeded best with *Calothrix scopulorum*. As this species is not uncommon all round the British coast, forming a dark green skin on the rocks, the accuracy of Dr. Gyula's remarks can easily be tested.

The investigations of Pringsheim on the nature and mode of formation of chlorophyll have been gone over by A. B. Frank (*Journ. Micr. Soc.*, p. 528), and among other interesting results arrived at he concludes that the change of colour of leaves in autumn is due to the disappearance of the protoplasm of the cells, in consequence of which the chlorophyll grains come in contact with the acid cell sap, the result being the change of the green colour into yellowish green or yellow, followed by the separation of oily drops of hypochlorin. The same change takes place in fruits and also in leaves which become yellow from want of light. Wiesner regards the protection of chlorophyll from injury as one of the functions of vegetable protoplasm.

In *Comptes Rendus* (xcv., 487), a note by Mr. E. Mer is published which throws some light on the curious dimorphic leaves of aquatic Ranunculi. He considers that as the petioles of submerged leaves elongate, while the contrary is the case with the floating leaves, it is probable that the petiole absorbs the nutritive matter to the detriment of the limb, the submerged leaves not producing starch and not being capable of transpiration. This does not apply to sessile leaves, since in them there is no disturbance of the nutritive balance, the dimensions only of the leaf being lessened.

Some interesting results have been obtained by A. J. Kunkel (*Journ. Micr. Soc.*, p. 532) concerning the various electric phenomena observed in plants. He found that the leaf veins are generally positive towards the rest of the leaf, but the direction of the current is reversed if the spot on the leaf where the electrode is placed is wetted before the other electrode is placed on the vein. A spot long moistened is positive towards one freshly wetted. When a plant is bent or wounded the electrode near the bend or wound is negative to the other. Dr. J. Burdon Sanderson has noticed somewhat similar phenomena in the leaf of the Venus's fly trap (*Dionæa muscipula*), the under surface of the sensitive lobe of the leaf being electro-negative to the upper at the moment that the leaf is irritated; after about half a second the upper surface becomes electro-negative and remains so for some time.

Baron F. Mueller, the well-known botanist, Director of the Botanical Gardens at Melbourne, defends, in the *Gardeners' Chronicle*, p. 278, his use of the words "algs" and "fungs" instead of "fungi" and "algæ," on the ground of comformity with the terms mosses and lichens. In the same way he uses the word "eucalypts" instead of "eucalypti," just as we say 'elms" instead of "ulmuses." His use of the diminutive termination "let" in "stalklet," "fruitlet," etc., and other alterations proposed by him, are, it may be hoped, the commencement of a change of foreign botanical terms into more easily understood English ones, a change which would certainly render the study more easy and pleasant than it is at present, and tend to remove the reproach that botany is a science of hard names.

In the report by Dr. Cobbold (*Nature*, p. 492) to the British Association, on the injurious parasites of Egypt, he points out that the little fluke parasite (*Bilharzia hæmatobia*) which causes endemic hæmaturia, although it is a genuine fluke parasite of the class which requires a change of hosts for its development, can still produce the disease if swallowed in the form of the free swimming *Cercania*, and that therefore the canal water in which these occur should not be drunk in the unfiltered state. In another paper, on the brown coloration of the Southampton water, by Dr. A. Angell, the colour is attributed to a brown organism (*Pendinum fuscum*), from which both brown and green solutions can be obtained giving the spectroscopic appearances characteristic of chlorophyll. The author considers it probable that the organism is of a vegetable nature.

In some experiments as to the conditions conducive to the action of pepsine, made by Herr A. Mayer (*Zeits. f. Biol.*, xvi., 351; *Mon. Scient.*, [3]., xii., 842) it was found that the action was favoured by elevation of temperature; the limit is, however, reached at 55° C., for between 55° and 60° the ferment is killed. Hydrochloric acid of a strength corresponding to 2 parts of acid in 1000 was found best to promote the action. Other acids were tried and gave results corresponding with the following order:—nitric, oxalic, sulphuric, lactic, tartaric, formic, succinic, acetic, butyric, salicylic. The last two had no action. Coagulated albumen was the substance operated upon and the pepsine used was prepared by macerating the mucus from a pig's stomach with glycerine and precipitating with alcohol. The presence of bacteria did not in any way retard the action of the pepsine.

In a recent communication to the Société de Biologie, M. de Korab described some results following the use of "helenin" in pulmonary diseases. The same observer now reports (*Comptes Rend.*, xcv., 441) some experiments made as to the action of that substance upon the bacilli of tuberculosis. He states that when the organisms were suspended in sterilized serum and placed in tubes, into some of which helenin was also introduced, the bacilli multiplied in the liquor containing no helenin, but that in which it was present showed no signs of their development. Further, whilst the former liquid when injected into animals produced the tuberculous condition the latter appeared to be inert in this respect. Some other experiments appeared to show that helenin administered in the food or injected subcutaneously acted as a preventive to tuberculous infection by inoculation, or in cases where the disease already existed modified it favourably. As the publication of this communication may possibly lead to some inquiries respecting helenin, it may be useful to recall the fact that it is a crystalline substance occurring in small quantity in elecampane root (*Inula Helenium*), and is represented by the formula C_6H_8O. According to the authors of 'Pharmacographia' the crystals have a slightly (?) bitterish taste, but no odour, and melt at 110° C.

A chemical investigation of the white and the yellow water lilies (*Nymphæa alba* and *Nuphar luteum*) has been carried out by Herr Grüning, in the laboratory of the University of Dorpat. He reports (*Archiv*, xx., 589) that he has separated an alkaloid from the rhizomes of each of these plants. The alkaloid from *Nuphar luteum*, which he has named "nupharine," is soluble in alcohol, chloroform, ether, amyl alcohol, acetone and dilute acids, but is almost insoluble in petroleum spirit. No crystalline salts have yet been obtained, and of the alkaloid only small greenish crystals have been obtained with difficulty. Nupharine is precipitated by the usual alkaloidal reagents. Upon analysis results were obtained corresponding with the formula $C_{18}H_{24}N_2O_2$, which is the composition attributed by Pelletier and Couerbe to menispermine and paramenispermine, with neither of which is it, how-

ever, identical. The alkaloid from *Nymphæa alba*, which had previously been observed by Dragendorff, resembles nupharine in its physical characters and its behaviour towards solvents and alkaloid reagents, but differs entirely in a series of colour reactions. No alkaloid was obtained from the seeds of *Nuphar luteum* or from the seeds or flowers of *Nymphæa alba*.

The conditions under which ammonia in contact with copper becomes oxidized have been studied by Dr. S. Kappel (*Archiv*, xvii., 567). He finds that in contact with copper, and with access of atmospheric air, ammonia is converted into nitric and nitrous acids even in the cold, but that the conversion is accelerated by heat; in both cases, however, all the ammonia is eventually oxidized. An acceleration of the oxidation takes place also in the cold if the operation be conducted in a current of carbonic acid gas, due to the formation of carbonate. If access of atmospheric air be entirely excluded, the oxidation of ammonia in contact with copper can no longer be recognized with certainty. Zinc and iron in contact with ammonia and with access of atmospheric air are capable of producing nitrites, but their action is weaker than that of copper, which Dr. Kappel thinks is possibly due to the hydrogen liberated in the nascent state exercising a reducing action upon the nitric and nitrous acid already formed.

According to M. Debray (*Comptes Rend.*, xciv., 1222) the reaction by which mercuric chloride in aqueous solution is converted into calomel in the presence of sulphurous acid no longer takes place under ordinary conditions if the solution contains a considerable quantity of sodium chloride, even if the solution be boiled and the sulphurous acid be continually renewed. But the reaction does take place slowly if the mixtures of chloride and dissolved sulphurous acid be heated in sealed tubes to a temperature of about 120° C. M. Debray also states that when mercuric chloride is precipitated with potash or soda in the presence of a considerable excess of sodium chloride the formation of intermediate oxychlorides does not take place, but after a short time there is produced a crystalline precipitate of oxide, which is more dense than the oxide ordinarily obtained by precipitation; this precipitate is yellow when formed in a cold liquid, but if the liquid be boiling it is of a red colour near to that of the oxide obtained by calcination of the nitrate. Like this latter, the red crystalline precipitated oxide is not attacked by dry chlorine; but the yellow crystalline oxide is slightly attacked, though much more slowly than the ordinary amorphous oxide.

In a paper on the hydrocarbons of the formula $(C_5H_8)n$, read before the Chemical Section of the British Association at its recent meeting (*Chem. News*, Sept. 15), Dr. Tilden mentions an experience that may eventually become of some practical importance. It related to isoprene (C_5H_8), a very volatile liquid discovered by Mr. Greville Williams among the products of the destructive distillation of india rubber, which has the property of being reconverted into india rubber by treatment with strong aqueous hydrochloric acid or nitrosyl chloride. As isoprene, when heated to about 280° for some hours, polymerizes into a terpene, which appears to be identical with terpilene, the optically inactive hydrocarbon obtained from turpentine, and when subjected to the action of sulphuric acid behaves precisely in the same manner as turpentine oil, Dr. Tilden was induced to try whether turpentine could be partially depolymerized into isoprene, and the synthetical production of india rubber be accomplished in this way. Upon passing turpentine through a red-hot tube and fractionally distilling the product a small quantity of liquid was actually obtained having the same composition and some of the properties of isoprene, and which by the action of hydrochloric acid yielded a tough substance closely resembling caoutchouc. But sufficient of this liquid has not at present been obtained to enable Dr. Tilden to say positively that it is isoprene.

It is known that the presence of organic matters in saline solutions will in some cases prevent the formation of precipitates, and a communication from Messrs. Lefort and Thibault (*Jour. de Pharm.*, [5], vi., 169) appears to show that a substance commonly used in dispensing, gum arabic, is capable of affecting the formation of precipitates to an unexpected extent. In operating under certain conditions these chemists have found that in the presence of gum precipitates of metallic sulphides are not formed in dilute solutions (one-tenth of an equivalent per litre). Metallic oxides behave similarly in more concentrated solutions, corresponding with their greater solubility in water. The same result was observed with mixtures of neutral phosphate of ammonia and chloride of calcium, nitrate of uranium and ferrocyanide of potassium, and perchloride of iron in dilute solution and ammonia. But what is perhaps of even more importance is the influence of gum arabic in the case of alkaloids, solutions of 1 in 1000 of quinine, cinchonine, morphia, strychnia, brucia, and veratria not giving in the presence of gum a precipitate with phosphomolybdate of ammonia, the double iodide of mercury and potassium, or tannin. On the other hand, iodide of lead, iodide of mercury, sulphate of barium and carbonate of lead are precipitated from solutions containing gum, as completely, though more slowly, than from distilled water. This action of gum may be profitably taken into consideration by a respected correspondent of this Journal who, a short since, criticised the recommendation to use gum mucilage in dispensing.

According to Payen, as much as 50 per cent. of crystallizable sugar remains in molasses, being prevented from crystallizing by other bodies present with it. Several methods have been suggested for avoiding the consequent loss; amongst others treatment with baryta or lime, so as to form insoluble compounds with the sugar. Strontia has also been recommended for the same purpose, and appears recently to have found practical application at Dessau. According to Dr. Bittman, in a lecture delivered at Magdeburg, caustic strontia is added in excess of the sugar to the heated molasses and the mixture is raised to boiling, when a separation takes place of an almost insoluble saccharate of strontium. This compound after separation is mixed with water, and allowed to decompose spontaneously, when a portion of the caustic strontia crystallizes out; the remainder is precipitated as carbonate by carbonic anhydride. The residual solution of sugar is then treated as refinery syrup. It is estimated that 38 per cent. of crystallizable sugar can be recovered from molasses by this process. At first some difficulty was experienced as to a sufficient supply of caustic strontia, which was obtained by roasting strontianite, but this has been overcome by the discovery of fresh mines of the mineral and the use of celestine. The strontium carbonate formed in the

process is regenerated by making it with sawdust into bricks, and burning these in a gas furnace.

In an interesting account of the chemical industries of Italy (*Chemiker Zeitung*), the surprising fact is pointed out that although lemon juice is made in many places in Sicily, when it represented in 1881 a value of nearly three millions of francs, the whole being exported, chiefly to England and France, yet in Italy no one appears at present to be engaged in the manufacture of citric acid. Up to 1880 one factory existed at Messina, but when that town was made a free port it had to stop operations.

The *Weekly Drug News* (Sept. 1, p. 3) contains an article on sponge fishery in the Bahamas, from which it would appear that the Governor of those islands has approved a law passed in a special session of the Legislature to prevent the use of dredges, which have for some time past been used with considerable success instead of the pole and hooks. The penalty for violation of the law is a fine of 100 dollars and confiscation of the vessel on which a dredge is found. The law seems to have been passed under pressure of popular clamour, and in forgetfulness of the fact that there are many sponges to be obtained at a depth where the use of the pole and hooks is impracticable, and that the use of the dredge would have increased the trade without affecting vested interests had its use been confined to fishing at such a depth. How far this law will affect the price of sponges remains to be seen.

About twelve months since some cases were reported (*Pharm. Journ.*, [3], xii., 81, 176) in which symptoms simulating an attack of erysipelas followed the use of a scent sold as a preparation of heliotrope, and the explanation was suggested that the preparation might have been an artificial coal tar product. However this may be, it would appear that heliotrope is not without beneficent physiological properties. A medical correspondent of the *Medical Press and Circular* (Sept. 13, p. 230) states that while suffering from a long illness of gastric fever, instead of using the ordinary opiates, he had a small bunch of heliotrope placed in his bedroom at night, and to the odour of the flowers he attributes the refreshing sleep he obtained.

The effect of prescribing disagreeable medicines for some classes of patients, and especially the roving class which is often met with in hospital practice, is well known. Sometimes an artifice in the shape of a pleasant medicine is useful in securing the return of a patient whom it is desired to see again. The following form for a "lemonade iron" prescribed in a case of this kind was recently mentioned in a clinical lecture by Professor Goodell, of Pennsylvania University (*Practitioner*, Sept., p. 223):—

℞ Tinct. Ferri Chloridi . . . . . ℥ij.
Acidi Phosphorici dil. . . . . ♏vj.
Spiritus Limonis . . . . . ℥ij.
Syrup. . . . . ad ℥vj.
M. Sig. A dessertspoonful, in water, after meals.

The spiritus limonis, U.S.P., is prepared by dissolving two fluid ounces of oil of lemon in two pints of stronger alcohol (sp. gr. 0·817), adding a troy ounce of freshly grated lemon peel, macerating for twenty-four hours and filtering through paper. It is used in this case with simple syrup as not being so sour as syr. limonis.

The value of jalap root is often roughly estimated by its weight, some pieces being much heavier than others and containing less resin. The powder likewise varies much in percentage of resin, twelve American samples recently assayed by Mr. V. Coblentz (*Amer. Journ. Pharmacy*, [4], xii., 385) being found to vary in yield of resin from 3·8 to 16·2 per cent. In the *Pharmaceutische Centralhalle* (iii., 307), Dr. H. Hager remarks that specimens of the root which have a specific gravity below 1·40 should be rejected. He considers that unless ninety out of a hundred specimens of a sample of the root sink in a solution of salt of the above specific gravity, the drug cannot be considered of good quality. He founds this opinion upon the fact that the resin of jalap is heavier than water, its sp. gr. being 1·15 to 1·16, while that of the sugar is 1·5 to 1·6. From these figures, however, it is obvious that the weight may be affected by the proportion of sugar and cannot necessarily be considered a criterion of the resinous contents of the root. Indeed some specimens selected from the stores of the Museum of the Pharmaceutical Society a year or two ago and separated into light and heavy portions were examined with the result that more resin was obtained from the light than from the heavy pieces. Dr. Hager, however, asks other experimenters to confirm, or otherwise, the results he has obtained.

From samples of belladonna root which have reached this country from New York, it is evident that the Japanese belladonna root has been sold for the genuine root in the United States and that the roots have not been distinguished.

Dr. Denis Dumont recently communicated to the Paris Academy a report of a case of hydrophobia in the Caen Hospital, which he had cured by hypodermic injection of nitrate of pilocarpine three times a day (*Practitioner*, p. 213). One so frequently hears of cases of cure of hydrophobia, that any cases in which confirmation of previous reports is given are worth recording. Unfortunately, however, as yet no remedy seems to have been successful in different hands.

Dr. Dumonprez (*Bull. Gen. Therap.*, p. 89) considers worm seed superior to santonin for killing as well as expelling round worms. He states that santonin does not kill the worms outright, but excites them to livelier movements which may reflexly stimulate the intestine to expel them. If this be true, it is important to know whether the fatal action of the drug on the worms is due to essential oil, and also whether the Barbary or Levant or other worm seed was used in Dr. Dumonprez's experiments, since the Barbary kind is not known to contain santonin, but is to be met with in commerce.

The mango fruit (*Mangifera indica*) it may be presumed in an unripe state, is being tried in the United States in medicine. Dr. Linguist, who has introduced it, states (*Practitioner*, p. 220) that it is an astringent with a special tonic action on the mucous membrane, and that in the treatment of hæmorrhage and muco-purulent discharges he knows of no equal to it.

In the *Boston Medical and Surgical Journal* (p. 221), Dr. A. P. Mason, gives an account of experiments made on himself with coca. He has arrived at the conclusion that coca had a good effect upon him both mentally and physically; that it almost always produced exhilaration and without exception prevented fatigue. This he believes to be due to stimulation of the nervous system and retardation in some way of the process of metamorphosis, so that work is done with less expenditure of force with than without coca. The experiments were made with the fluid extract. Coca leaves are so very

variable in quality that experiments made with them cannot be said to be so satisfactory as if made with either the crystalline alkaloid, cocaine, or the volatile oil, hygrine.

Dr. E. W. Barton, in the *Lancet* (p. 333), recommends sulphide of calcium in the treatment of cancer. In two cases which appear to have been well authenticated, one of them being cancer of the breast, the remedy was given with the result of the disappearance of the disease. The sulphide was administered in the dose of 1 grain, increased to 3 grains, during the day and continued for three months.

Dr. J. H. Whelan, in the *Lancet* (p. 348), in describing some medical uses of the alkaloid atropine points out that it is valuable in preventing "death from shock" or nervous fright, and that it is valuable on that account for giving before operations. He calls attention also to the statement made by Dr. Gentilhomme, of Reims, to the effect that $\frac{1}{100}$ gran of the alkaloid relieves coryza or severe cold in the head in a most remarkable manner. In one case in which the drug was administered in fifteen minutes afterwards all sneezing ceased, the secretion stopped and respiration became normal.

A singular account is given in the *Lancet* (p. 311) of the deleterious effect of powerful electric light on the eye. Two workmen engaged in adjusting the carbon points of a lamp of 3000 candle power omitted to use coloured glasses while performing the operation. On ordinary occasions the brilliancy of the spark causes more or less paralysis of the retina, so that it is rarely possible to perceive the people walking on the footpath when descending the ladder from adjusting; but on this occasion one of the men experienced a severe attack of inflammation of the conjunctiva, the ball of the eye becoming of a brilliant scarlet; the other workman was similarly affected, but to a less extent. It does not appear whether the symptoms were caused by the brilliancy or radiant heat.

Pharmacists who have to handle metallic nickel for electro-plating will be probably glad to know of an easy, expeditious method of testing it. Mr. Thomas T. P. Bruce Warren, while trying the magnetic properties of some nickel cubes, found that only a portion of the sample was attracted by the magnet. On analysis the cubes remaining unattracted were found to contain over 33 per cent. of copper; the attracted cubes contained over 96 per cent. of pure nickel and less than a tenth of a per cent. of copper (*Electrician*, ix., p. 367). From this observation it will be seen that examination of samples of nickel by a magnet may occasionally give some useful information.

During the past month, a section of New York has been lit by the Edison incandescent lamp, being the first practical application on a large scale of electricity as a domestic lighting agent. The area lit includes no less than one square mile of the busiest part of New York, and fourteen miles of street mains are already laid. There are nine hundred and forty-six subscribers whose premises are already wired, the number of lamps supplied amounting to nearly fourteen thousand five hundred; at present some five thousand lamps are at work, but some ten or twenty buildings are being added daily to the number lighted. The subscribers pay "electricity rent" for the new light equivalent to the ordinary "gas rent," for the same amount of light. Thus the incandescent lamp, for the first time in its existence, enters into actual commercial competition with its powerful rival, gas, and, whatever may be the result, the community will certainly be gainers by the competition. The accounts published of the quality of the light are extremely flattering, and are all that its most sanguine supporters could possibly wish for. It now only remains to be seen what its financial future will be. The dynamo machines are of a somewhat larger type than the Holborn machines, which were described in this Journal (*Pharm. Jour.*, [3], xii., p. 925), otherwise they do not apparently differ in their essential details. Each machine is said to be capable of working 1800 lamps, at 16 candles, but it is only proposed to work them up to 1200. An extremely ingenious and original device is used to enabled unskilled labour to be utilized in regulating the current. It is an indicator consisting of two incandescent lamps, one of which has a blue glass globe, the other lamp having its globe of red glass. Neither of these lamps incandesce while the current is of normal strength. If from any cause the current in the circuit should increase in volume, the blue lamp lights up; the attendant then increases the resistance of the shunt circuits of the field magnets by means of a wheel switch which brings into the circuit one resistance coil after another, and this is done until the blue lamp goes out. If the reverse of these conditions should obtain (*i.e.*, too little current in the circuit), the red lamp becomes illuminated; in this event the attendant reduces the resistance of the shunt circuit by means of the wheel switch until the red lamp goes out. There are at present six of the large dynamo machines at work and these send their current into the two great main leads. Should it be suspected that one of the machines is working improperly it can be switched out of circuit without interfering with the others. The current of the suspected machine is then sent into a test battery of 1000 lamps; if these are found to have the proper amount of incandescence the dynamo is pronounced to be in proper order and is reinstated in the great circuit. All the details of the installation are very interesting reading and are exceedingly creditable to the great inventive genius of Edison, its originator.

It is a question whether the time has yet come when meteorology is entitled to be considered a science, for the conditions affecting weather phenomena are still so imperfectly understood that "forecasts" often include a considerable amount of speculation. In a letter, dated 4th September, that appeared in the *Scotsman* on the following day, attention was directed to the value of the spectroscope as an aid in this direction, and the writer, on the strength of the absence of the "rain band" on the morning of writing,—it having been for some time previously very strong,—ventured to predict the setting in of fine weather. This prediction appears to have been strikingly verified, as the 4th and the following four days were very fine in that part of Scotland, not a drop of rain falling, although the forecasts of the Meteorological Office for four of the five days predicted more or less wet. Confirmatory evidence as to the value of the spectroscope as a weather indicator appeared in a letter in the *Times* for the 14th inst., from Mr. Cory, who states among other things that if the amount of "rain band" is under 20 per cent. fine weather is certain for six hours, but that if, when the spectroscope is directed to the zenith, 80 per cent. of the dark band is shown, there will be a downpour of rain before long, although the barometer may be high and steady.

THE LACQUER INDUSTRY OF JAPAN.

BY JOHN J. QUIN,

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The following particulars are taken from a report intended chiefly as a description of the articles of various kinds illustrative of the lacquer industry of Japan, collected for the use of the Museum of Economic Botany at Kew, under instructions from Her Majesty's Chargé d'Affaires at Tôkiô.

Great difficulty has been experienced in obtaining thoroughly reliable information, as not only are the artificers, for the most part, uneducated, but they are entirely ignorant of what takes place in any other department except that to which they have been brought up. A well-known and most intelligent manufacturer, who has been over twenty years himself a worker in gold lacquer, was quite unaware of the mode of tapping and treating the trees, and had never even seen a cut specimen of the wood. He states that his head workman, a highly-skilled artizan over fifty years of age, hardly knows the name of a single article that he uses.

The *Rhus vernicifera*, the well-known lacquer tree of Japan, is met with all over the main island, and also in smaller quantities in Kiushiu and Shikoku, but it is from Tôkiô northwards that it principally flourishes, growing freely on mountains as well as in the plains, thus indicating that a moderate climate suits the tree better than a very warm one. Since early days the cultivation of the tree has been encouraged by the Government, and as the lacquer industry increased plantations were made in every province and district. The lacquer tree can be propagated by seed sown at the end of January or the beginning of February. The first year the seedlings reach a height of from 10 inches to 1 foot. The following spring the young trees are transplanted about 6 feet apart, and in ten years an average tree should be 10 feet high, the diameter of its trunk $2\frac{1}{2}$ to 3 inches, and its yield of lacquer sufficient to fill a 3-ounce bottle.

A more speedy method is, however, generally adopted. The roots of a vigorous young tree are taken, and pieces 6 inches long and the thickness of a finger are planted out in a slanting direction a few inches apart, 1 inch being left exposed above the ground. This takes place in the end of February and through March, according to the climate of the locality. These cuttings throw a strong shoot of from 18 to 20 inches the first year, and are likewise planted out the following spring. Under equally favourable circumstances these trees would in ten years be nearly 25 per cent. larger in girth, some 2 or 3 feet higher, and would yield nearly half as much more sap than the trees raised from seed.

It has not hitherto been the custom to bestow any special care on the trees after planting them out, but in cases where leaf or other manure has been applied they are much finer. Of late years hill sides and waste grounds alone have been used for lacquer plantations, as, owing to the rise in the price of cereals and farm produce generally, it does not pay the farmers to have their land cumbered with trees. Those that have been hitherto planted along the borders of the fields are being rapidly used and uprooted, and, where practicable, mulberry trees are planted instead, with a view to rearing silkworms. Nevertheless, as a good workman is expected during the season to tap an average of 1000 trees ten years old, and as the Province of Yechizen alone sends out about 1500 "tappers" yearly to the various lacquer districts, it will be seen that an immense production annually takes place, stimulated, doubtless, by the demand for cheap lacquered articles abroad. To remedy the possible exhaustion of the supply, and in view of the great rise which has taken place in the price of lacquer, several companies are being projected to plant waste lands with the trees. A ten-year-old tree, which some five years ago only cost from 1 to 2 sen, now costs 10 sen, which, allowing even for the depreciation in the value of the paper currency, shows a rise of about 500 per cent.

The best transparent lacquer comes from the districts of Tsugaru, Nambu, Akita, and Aidzu. It is largely used by the workers of Kioto, Osaka, and the southern provinces, but though also used in Tôkiô is not so much appreciated there as the lacquer produced from the neighbourhood of Chichibu in the Province of Mus-ashi, from Nikko in Shimotsuke, and that produced in the Provinces of Kōdzuke and Sagami, which hardens more rapidly, and is best for black lacquer.

There are some districts the lacquer obtained from which is best for certain kinds of work, but is not so well adapted for others. The kind which is used for transparent lacquer is mixed in large tubs, to insure a uniform quality, and being allowed to stand for some time (say, a week or ten days), the best portion, which is ordinarily 70 per cent. of the whole, is skimmed off. This is used for *Nashiji* and *Shu* lacquer, while the remainder is used for making inferior mixtures, such as *Jōhana*, etc., all described elsewhere. Almost all the various classes of lacquer are similarly dealt with to insure uniformity, as some qualities dry much quicker and are better than others, and the slow drying qualities would otherwise remain unsold.

The whole country produces at present on an average from 30,000 to 35,000 tubs per annum, each tub being of about 4 gallons capacity. Some 70 to 80 per cent. of this total amount is produced from Tôkiô northwards. Nearly one-half of the lacquer produced is sent to the Osaka market, where it is prepared as required and resold all over the western and southern provinces, the remaining portion being used up locally and in Tôkiô.

The usual age at which a tree is tapped is ten years, but in some few cases a tree is tapped when only three or four years old. The best lacquer for transparent varnish is obtained from trees from one to two hundred years old, as their sap has more body, and is more glutinous. The tools used in obtaining the lacquer are as follows:—

Kawa-muki (bark parer), a curved knife with which the workman smooths all inequalities of the bark before tapping the tree.

Yeda-gama (branch sickle), an instrument with a gouge on one side and a knife on the other, fitted with a piece of bamboo to give the hand a good hold when tapping branches.

Kaki-gama (scraping sickle), a similar instrument, without the piece of bamboo used for tapping trees generally.

Yeguri (a gouge), used in autumn to scrape the bark smooth before giving the final cut with the *kaki-gama*.

Natsu-bera (summer spatula), used for scraping the sap out of the incisions into the receptacle named *gō*.

Hōcho (knife), used for cutting the bark of branches in obtaining *seshime* or branch lacquer.

Seshime-bera (seshime spatula), used for collecting the sap which exudes from the incisions in the bark of the branches.

Gō, the bamboo or wooden pot, in which the sap is put as it is collected.

Gō-guri (pot gouge), a long straight knife for scraping the lacquer out of the pot into the tub.

Te-bukuro (glove), worn by the tapper to protect his hand from contact with the sap.

The first tapping takes place about the beginning of June. The standard number of trees allotted to a tapper for the season is 1000—presuming them to be about ten years old (the size of the small specimen), about 800 of the size of the large specimen, and so on, less and less according to the size of the trees. Having cleared away the grass from the roots, the workman makes the round of his allotted trees, marking each with small notches about $\frac{1}{2}$ inch long. The first of these notches is made about 6 inches from the bottom of the tree on the right hand side; and next, one "hand stretch" higher up on

the left hand side; the next, one "hand stretch" higher on the right, and so on, alternately as far as the workman can reach. These preliminary markings, which are to determine all the places for subsequent tapping, take fully four days, being at the rate of 250 trees a-day. The tapper then goes round, provided with the bark scraper, the ordinary scraping sickle, the summer spatula, and the pot to held the lacquer, and first smoothing the bark where required gives one cut above and one cut below the two lower marks, and one cut above the remainder of the other marks, the cut being in each case about 1½ inch long. After giving the cut the instrument is reversed, and the knife is run along the incision to insure the bark being entirely cut through. This process is repeated every four days, each incision being made a little longer than the preceding one, up to the fifth tapping, inclusive, after which the remaining incisions are made of the same length. At each round, when all the requisite incisions have been made on the tree, the workman gathers the sap which has exuded with the spatula, beginning with the two lowest incisions, and so on to the uppermost cut. Twenty-five is considered the normal number of cuts, which, at the rate of one incision at each place every four days, occupy one hundred working days, and allowing for some twenty days of rain during which the sap cannot be drawn, the season is brought to a close by the end of September. If the workman has any large trees to tap, the whole of which he cannot reach when making his ordinary rounds, he taps all he can reach, and when his round is concluded he returns with a ladder, and mounting each tree taps the remainder of the trunk and the leading limbs in the same manner as above described, previous to making a fresh round.

When the full number of incisions has been given, the workman gives an extra long cut underneath all the initial notches on each tree to obtain the sap which has collected there, and another above the uppermost cut of each set. These incisions are called *Ura-me* (back marks). The workman also makes a number of cuts, each about a foot apart, in all the branches whose diameter exceeds 1 inch. This operation requires about sixteen days to get through the whole number of trees. The next operation is called the *Tomé* (the finish). This consists in a number of incisions completely encircling the tree wherever the workman perceives a likely place. The next process consists in cutting off all the branches: the larger ones are once more tapped after being cut off to extract any sap that may still remain in them, and the small branches which have not yet been tapped are tied in bundles and steeped in water for about ten days. When taken out and dried the bark is cut with a knife, and the sap which exudes is collected with the branch spatula, and is called *Seshime* lacquer. This word seems to be derived from *Sehi*, the name of a machine, and *shimeru* (to press), from a practice which obtained in olden days of pressing the branches in such a machine to optain the sap. It is also known as *Yeda urushi*, or branch lacquer, which latter more explicit term is, for the sake of convenience, used throughout this report.

The sap obtained from the first five cuts above each notch is poor, containing, as it does, a large proportion of water; the middle fifteen cuts produce the best sap, and the sap obtained from the last five incisions is poor, and lacks consistency. Again, the sap obtained from the *Ura-me* (back marks) and *Tomé* (finishing) cuts is very good, and dries quickly.

The sap from the first twenty-five cuts is mixed and sold together, but the *Ura-me* and *Tomé* sap is almost always mixed and sold separately. The operations above described kill the tree in one season, but frequently the tree is made to last two years or more, by giving only half the number of incisions, and reserving the *Ura-me* and *Tomé* cuts for the final year. The sap obtained the second and following years is, however, of an inferior quality, and this method is only resorted to by private individuals, who tap their own trees during the intervals of farming. Ordinarily, a wholesale dealer in lacquer buys so many thousand trees from the owner, and, as a matter of course, extracts the sap with as little delay as possible, making a contract for the purpose with professional tappers. A first-rate workman will receive over 100 yen (equal, at the present low rate of exchange, to nearly £13 sterling) for the season, and can collect four and a-half tubs (equivalent to 18 gallons), but the average receive 75 yen, and collect proportionately less. The present price per tub of lacquer ranges from 90 to 100 yen.

After the sap has been taken the exhausted tree, which remains the property of the seller, is cut down by him, and is used for firewood, for building purposes, or for making boxes. The roots of the young trees throw from three to five shoots the following spring, and these can be used in six or seven years. Of these five sprouts three are commonly much stronger than the other two. In such cases, the strong ones only are tapped and cut down, the weaker ones being allowed a year or two longer to grow, when, receiving the whole of the nutriment, they shoot up in one year as much as an ordinary tree would in three. After tapping and cutting down, fresh shoots to the number of five are again allowed to sprout, and so on, the root not seeming to become exhausted by the process; but when a very old tree is cut down the root will not give out new shoots. In the northern provinces very old and large trees are met with in considerable quantities. These were kept for the sake of their berries, from which the wax used for the Japanese candles was obtained. This was the more profitable use to which to put the tree, as a good tree, from eighty to one hundred years old, yielded yearly, on an average, equal to 6*s.*, while the price of a ten-year-old tree to be used for extracting the sap was under ½*d.* Previous to the revolution of 1868 every tree reserved for making wax was officially registered, and the owner was not allowed to mutilate it in any way. Even if a tree died, he had to get official permission before removing the stump. The Shōgun's Government and also the local magnates had large plantations of the lacquer tree reserved for wax, but since the opening of the country to foreign trade, and the introduction from abroad of kerosene oil, the wax industry has greatly declined, and there are now no restrictions on the free sale of the tree for tapping, and, consequently, all the fine old trees (which will sell for from 5 to 6 yen each) are fast disappearing.

To show the relative value of the berries and the trees a few years ago the following may be cited:—A wholesale lacquer merchant informed me that five or six years ago he went as usual to purchase trees in the district of Aidzu, and among others bought one tree for a yen (then equal to 4*s.*), the owner reserving the berries that might be got as his own property. He does not consider the bargain was a cheap one, but the owner realized the sum of 80 sen (equal to 3*s.* 2*d.*) from that year's yield of the berries alone before cutting down the tree.

It should be mentioned that the above description of the method pursued in tapping the lacquer tree is that which is recognized as the proper one; but, as even the specimens of the lacquer tree forwarded will show, the rule is not rigidly observed, the style and size of the tree, and the caprice of the workman, combining to cause variations in the number of incisions given in each series.

Various Woods used in making Lacquer Ware.

The woods chosen for lacquering on are naturally selected according to the use to which the lacquered article is to be put. For shelves, cabinets, and boxes of all kinds, the following are principally used, and are set down in the order of their excellence:—

Hinoki (*Chamæcyparis obtusa*).—This is by far the best wood for making boxes, as it does not warp.

Kiri (*Paulownia imperialis*).—A light wood, used for

clothes boxes, which are only lacquered on the outside. It is also used for making teacaddies, as the wood has no smell.

Hōno-ki (*Magnolia hypolema*).—All sword sheaths have hitherto been made of this wood.

Sawara (*Chamæcyparis pisifera*).—This is a wood of a coarser grain than *Hinoki* (*Ch. obtusa*).

Hime-ko-matsu.—This wood is used for carved figures of men, animals, etc. It is not liable to split and crack.

Tsuga (*Abies tsuga*).

Hiba (*Thujopsis dolabrata*).—Used for making cheap articles.

Akamatsu (*Pinus densiflora*).

Sugi (*Cryptomeria japonica*).—This wood is only used in making the cheapest and most inferior goods.

The following woods are mostly used in the manufacture of such articles as are turned in a lathe, as bowls, rice cups, round trays, etc.:—

Keyaki (*Planera japonica*), the best being obtained from the province of Hiuga.

Shoji.

Sakura (*Prunus pseudo-Cerasus*).

Katsura (*Cercidiphyllum japonicum*).

Tchō (*Ginko biloba*).

I-go.—Grown in large quantities in the neighbourhood of Hakone. It is principally used in the manufacture of toys and cheap articles.

Buna.—Principally used in the district of Aidzu for the same kind of utensils as *Keyaki* and *Sakura*, but being a brittle wood, it cannot be turned in a lathe to make such fine articles; those made of this wood are coarser and heavier. For raising gold lacquering over the unvarnished surface, the following hard ornamental woods are often used:—

Shitan.

Tagayasan.

Karin (quince).

Kuwa (mulberry).

Keyaki (*Planera japonica*).—Ornamental grain.

(*To be continued.*)

ACETATE OF LIME AND ALLIED SUBJECTS.*

From an interesting paper on this subject, by Messrs. Stillwell and Gladding, read before the American Chemical Society, we abstract the following:—

METHODS OF ANALYSIS.

1. *Based on the Amount of Soluble Lime Salts present.*—The value of an acetate of lime depends entirely on the amount of glacial acetic acid present. Two methods of analysis are in use at the present time; one determines the amount of lime salts soluble in water, and by calculation the amount of lime so found is converted into acetate of lime, or glacial acid, as the case may be. This method is based on the supposition that all the soluble lime salts present are acetates; but this is not so. Acetates of lime almost invariably contain caustic lime in slight amount, and if the lime has been overheated, it is present in still greater quantity. Again, organic salts of lime are always present. With improved methods of manufacture, the amount of these has diminished of late years, and the difference between the amounts of acetate of lime found by distillation of the acetic acid and that found from the amount of soluble lime is much less than formerly. The better the sample of acetate, the less is the difference between the results given by the two methods.

In the year 1872 (see *American Chemist*, vol. ii., p. 324, and vol. iii., p. 8), this question of methods of analysis came up. It is necessary to state here the objection raised by certain English chemists against the process of distillation, which was advocated by some American chemists, since the objectors to a distillatory process had no good foundation upon which to rest. But as the general custom of the trade was at that time based upon the method of analysis by means of the soluble lime salts present, we have before and since that date used the term "*English Commercial Test*," to designate analyses made in this manner, and so state the results on our reports of analysis. Whenever an analysis is made by distillation it is so stated.

2. *Based on the Distillation of the Acetic Acid.*—Three acids may be used in the process of distillation—hydrochloric, sulphuric, or phosphoric.

a.—When *hydrochloric acid* is used, a part of it is carried over with the acetic acid and must be estimated and a correction made. It possesses these two advantages; that it does not act upon the organic matter present, and that the solution of chloride of calcium will permit of the distillation being carried to a low point without danger of error. The distillation is made in a retort connected with a condenser, and the total acids present in the condensed liquid are estimated, and the proper correction applied for the amount of hydrochloric acid found to be present.

b.—The use of *sulphuric acid* has three disadvantages.

First.—As it becomes concentrated in the retort during the process of distillation, it acts upon the organic matter present, forming sulphurous acid, which is carried over with the acetic acid and included in the estimation of the total acid power of the distillate. Thus the amount present would be calculated as acetic acid, and the result thereby increased unduly. To prevent such action, recourse is had to distillation in a current of steam. (See *American Chemist*, vol. vi., p. 294.)

Second.—The sulphate of lime formed by the addition of sulphuric acid to the solution of the acetate of lime, is troublesome on account of the bumping which takes place during the distillation. This is partly prevented by the use of a current of steam.

Third.—When a sample of acetate of lime contains *chloride of calcium* or *chloride of sodium*, the chlorine is carried over in the form of hydrochloric acid and neutralizes its equivalent amount of the standard soda, used to receive the acid distillate. The amount thus distilled must be estimated and the correction made. To prevent this, the chlorine present is precipitated by the addition of sulphate of silver to the solution of acetate before distillation begins.

c.—*Phosphoric acid* is the best acid for use in the process of estimating acetic acid by distillation. It has three advantages.

First.—It does not act on the organic matter.

Second.—During the distillation, the liquid in the retort is not suffered to fall below 15 c.c. in bulk. Under such circumstances, phosphoric acid does not decompose any chlorides of calcium or sodium which may be present in the acetate, thus requiring no addition of sulphate of silver. Only the merest trace of chlorine is carried over, as shown by experiments with a sample of acetate containing nearly 5 per cent. of chloride of sodium and also by trial on a known amount of pure chloride of sodium. This unexpected result merits attention, since in this respect phosphoric acid differs so decidedly from sulphuric acid.

Third.—It forms a perfectly clear solution with the acetate of lime. By the use of a large amount of glacial phosphoric acid, at least five times the weight of acetate of lime taken for analysis, the phosphate of lime first formed is redissolved to a clear solution. The distillation proceeds quietly and uniformly without bumping, and the liquid in the retort is easily kept at any desired point. The use of a current of steam is necessary, both for ease of manipulation and accuracy of results.

After a thorough trial of hydrochloric and sulphuric acids we discarded both in favour of phosphoric acid, and for some years past have used it to our full satisfaction. It is important that the phosphoric acid used should contain no nitric or other volatile acids which would increase

* *Journ. of the Amer. Chem. Soc.*, iv., 104. Reprinted from *New Remedies*, September, 1882.

the results obtained above the truth. Each new lot of phosphoric acid should be examined for such impurities before use. If it be suspected that any phosphoric acid has been carried over during the distillation it is easily detected in the distillate by the use of molybdate of ammonia.*

The process of distillation, if carefully and intelligently done, is very accurate. Duplicates made by this method agree with each other fully as closely as do those made by the estimation of the soluble lime. For example, in January last a sample of grey acetate was analysed by distillation in our laboratory with a result of 78·22 per cent. acetate of lime. Three months later the same sample was re-analysed by another man in our laboratory, using fresh standard solutions, and 78·20 per cent. of acetate was obtained. This sample contained 3·16 per cent. of common salt, shell-lime having been used in its manufacture. With care and experience in this method of analysis by distillation it is not difficult to obtain duplicates which agree to two-tenths of one per cent. of acetate of lime; usually the difference is less than that. A sample of grey acetate analysed recently was distilled with sulphuric acid, and a duplicate with phosphoric acid. The results agreed exactly; the latter distillation, however, requiring less attention than the former, for reasons given above under processes of distillation.

The indicator used for titration is a few drops of a solution of phenol-phthalein, one gram in 250 c.c. of a mixture of equal parts of water and alcohol. We have found this indicator far preferable to either litmus or cochineal; of course, whichever indicator is used the same must be used both for the standardizing and the actual analysis.

To show the need of some uniform and accurate method of analysis we refer to a note in Allen's 'Commercial Organic Analysis,' vol. i., p. 205. He finds from experiments made in his own laboratory on the *same sample* of acetate of lime that results were obtained varying from 47·4 per cent. to 57·6 per cent. of acetic acid. In our own practice for many years previous to the publication of the present, we found differences fully as great between results by distillation and by the various commercial processes; but, as we said before, at the present time the differences are not nearly so great as formerly.

In conclusion, we wish to lay strong emphasis upon the facts that, inasmuch as the process of distillation is the only one which gives the real amount of glacial acid present, and inasmuch as it is an imitation of the actual manufacturing process for obtaining acetic acid from its acetates, it is the most reliable and should be adopted. This position we have maintained for many years, and we notice that, especially in the case of grey acetate, buyers are more and more insisting on the test by distillation. The price should be based on the unit of glacial acid, just as, in fertilizing materials, the prices are based upon the units of phosphoric acid, nitrogen, and potash.

In the course of discussion on the preceding paper, Dr. Grothe asked if the authors had noticed the presence of acetone in the products of the decomposition of acetate of lime by heat.

Mr. Stillwell said he had not noticed it particularly, since his attention had been confined simply to the loss of acetic acid.

Regarding the production of acetic acid from wood Dr. Squibb remarked that it was not necessary to carbonize the wood, but that all the acetic acid could be obtained at a much lower temperature (about 160° to 200° C.), and the products then contain no acetone. For the analysis of sodium acetate he uses a glass retort covered with copper gauze, and heats it on one side to prevent frothing and bumping. He uses 10 grams of the acetate with 20 c.c. of water, and 10 c.c. sulphuric acid; after distilling off 10 to 15 c.c. of the liquid the distillation is interrupted—about 20 c.c. of water are added to the retort, and 10 to 15 c.c. of liquid again distilled over. This is repeated a third time, when all the acetic acid will have come over, without trouble from frothing or bumping during distillation.

Dr. Squibb further remarked that he used in his factory retorts 20 feet long, 2 feet wide, and 10 feet deep, holding 2½ cords of wood, and heats them in a hot air bath. During the first twelve hours, only water is given off. In about twenty-four hours the acetic acid begins to distil over, the process being completed in six to seven days for each retort. Seasoned oak is preferred, and any admixture of softer woods diminishes the yield of acetic acid. Chestnut is notable in this respect. Throughout the active heating, but more copiously toward the end, a gas, colourless and odourless (and so far as tested, uninflammable), comes over, having anæsthetic properties. This gas adheres to the wood after the charge is cooled and drawn, and seems to be a reason why small vermin will not remain near it. If the charge is heated too long, smoke appears at the exit pipe, and carbonization of the wood begins at the centre of the top of the charge, extending in V-shape toward the bottom. When once started, this carbonization proceeds spontaneously without further application of heat. Indeed, it is sometimes found difficult to check it, even by the liberal application of cold water to the outside of the retort. In the course of the operation, when properly managed, the charge shrinks to one-third of its volume. 4000 lbs. of wood yielded about 2800 lbs. of residue. The residue retains all the appearances of the wood before distillation, only that it becomes walnut-coloured, and it has the same elementary composition as that of kiln-dried wood. It is brittle and not well adapted to construction, but forms a most excellent fuel for many purposes, especially for kindling anthracite coal. The distillate is neutralized with soda-ash and distilled to about one-fortieth its volume. The first product is crude wood spirit. This is redistilled, and gives rectified wood spirit, and lastly wood oils, which contain large quantities of furfurol and no acetone. The wood oils are separated by passing the last portions of distillate into water. The rectified wood spirit contains about 80 per cent. of methyl acetate, and when saponified gives a very pure methyl alcohol. One cord of well-seasoned wood will afford 1200 to 1400 lbs. of liquid products. A cord of oak yields 60 or 70 lbs. of glacial acetic acid.

Dr. Squibb further remarked that there was no process commercially practical for obtaining pure acetic acid from pyroligneous acid or acetate of lime, but only from acetate of soda.

Mr. Parker remarked that he had tried a process for making acetic acid by heating wood fibre with steam, under a pressure of 60 lbs. at 275° C., and confirmed Dr. Squibb's observations on the deterioration of the woody fibre, and also the impracticability of making pure acetic acid from pyroligneous acid.

* The objection raised against this method by Dr. Waller, namely, that the presence of acetic acid interferes decidedly with the precipitation of phosphoric acid by the molybdate solution, was answered by Mr. Stillwell to the effect that he overcame the difficulty by using large quantities of ammonium nitrate.

IRRITATING EFFECTS OF STINGS IN THE ANIMAL AND VEGETABLE KINGDOMS.*

BY PROFESSOR AUGUST VOGEL.

It is well known that the effect of a stinging nettle on the skin agrees very closely with the sensation produced by the sting of a bee or wasp. But the great similarity is not limited to the feelings it causes, but, what may not be so well known, the cause of the irritation produced on the skin is essentially the same. It may be considered as definitely settled that formic acid is present

* From the *Scientific American*, September 9, 1882.

in the poison sac of the bee sting, in the so-called bee poison. The same corrosive acid also occurs in the sting of the nettle. Some species of caterpillars have formic acid in some of their hairs, which they seem to be able to shake off at will, and when a person touches such a caterpillar the poison penetrates the skin wherever it is moist and causes burning, itching, and inflammation. These poisonous members preserve their irritating powers even after the death of the worm. This accounts for reliable statements that visitors to collections of caterpillars have suffered from exanthematous eruptions on the neck. "Many hairy caterpillars cause itching and burning of the skin when touched, and sometimes it gives rise to swelling and redness. This depends on the fine hairs, which produce the same effect when they float around in the air. Many ladies who visited the caterpillar room of the naturalist Reaumur had a breaking out on the neck."

In the sting of the bee, wasp, hornet, etc., a minute drop of a transparent liquid may be observed on the sting, and is called "bee poison" (formic acid). It penetrates into the wound produced by the sting, and causes the well-known effects. It would, hewever, be a great mistake to assume that the only object of this is to increase the effect of the sting, that is, that it serves only to injure. It has a far more important purpose, namely, to prevent fermentation and decay. The celebrated bee cultivator, Holz, reports that in his long experience with honey that which came from what are called "rancorous swarms" (boshaft) had peculiar properties. It always had a bitter, harsh taste, and its smell was sharp too. How can the character of the swarm affect the smell and taste of the honey they gather? We know that bees, when they are disturbed, run out their stings, on the end of which may be seen a tiny drop. This little drop, as we have already said, is bee poison, or formic acid. When the disturbance is at an end they draw in their stings again, but the little drop of liquid does not go back with it, being wiped off on the comb, and sooner or later getting mixed up with the honey. This explains how honey from such excited bees must taste and smell sharper than from peaceable bees. Excitable bees will rub off this little drop of formic acid more frequently than other bees; perhaps a larger drop is formed by nervous bees than by those that are not nervous, and hence the honey is richer in formic acid. This acid is never absent from genuine honey, but the amount differs. This contamination is not only uninjurious but very useful, in fact, necessary, for it keeps the honey from spoiling; we know, indeed, that purified honey, from which the formic acid has been removed, very soon ferments, while unpurified honey will keep unchanged for years. Nature furnishes the bees with this knowledge instinctively, and therefore they do not carry this drop of formic acid away out of the hive. Bee connoisseurs assure me that the bees add it to the nectar which they collect that is free from it so as to make it keep, and they do this in places where they are not disturbed too.

Bee stings are often spoken of in agricultural and popular papers as a remedy for rheumatic affections, and numerous cures are adduced to prove it. If the formic acid that accompanies the sting can be looked upon as the principal agent in the cure, it would be worth while to try the experiment of rubbing the spot with this acid or injecting it under the skin, so as to avoid the somewhat inconvenient method of applying live bees.

Two hundred years ago formic acid was made from the brown wood ants, by triturating them with water and distilling it. The acid liquid was used to irritate the skin. The reddening of the skin, by using baths of pine leaves, is also due to the action of the formic acid. The anti-fermentative action of formic acid has also long been recognized.

As regards the irritative action of stinging nettles and other similar vegetables, it depends, as already stated, on formic acid. The point of the nettles is brittle as glass, and by the lightest touch penetrates the skin and breaks off, pouring out its acid and causing the burning sensation.

ANIMAL PRODUCTS IN THE CHINESE MATERIA MEDICA.*

BY F. NEWCOME, F.S.S.

Of animal products, musk probably stands highest in repute among Chinese doctors, but owing to prohibitive prices, the use of it is confined exclusively to the wealthier classes. For the pure unadulterated article obtained from the male *moschiferus*, or Thibet musk, from 20*s.* to 40*s.* an ounce is the common price to pay, and although the dose given is small—seldom more than ½ a drachm to a drachm at a time—it is impossible that the poor can afford such a luxury. Even high prices are frequently paid *wholesale* by Chinese merchants for home consumption, and this fact, viewed in connection with the average value of the musk exported to this country (during last year it was less than a guinea an ounce all round), leaves but one conclusion in our minds, namely, that the supply for this market is adulterated to a greater or less extent, despite London druggists charging for it gold price or higher. Last year (1881) the total exportation from China amounted to 1877 catties, or say 2503 lbs., valued at 149,780 taels, or about £41,501; in other words, the average was something like a guinea an ounce, whereas true musk always fetches from 30*s.* to 60*s.* an ounce at Shanghai or Tientsin. Here, again, it is just possible that some of the unfavourable results attributed to musk, and its bad repute among Europeans, may have been owing to adulteration, which, as everyone knows, was, and still is, largely carried on.

Bezoar stones are equally in repute, almost fabulous sums being given for the genuine article. For *Bezoar bovine*, classified in the Returns of Trade as "Cow Bezoar," the export price varies from 400 to 500 taels the catty; that is to say, from £6 to £7 10*s.* per ounce. Probably, however, several kinds of bezoar, including stones derived from animals of the goat tribe, are included under the generic term; but upon this point our knowledge is deficient. When such an astounding price is paid for the Chinese article by native dealers, there is little wonder if the samples that formerly reached Europe were spurious as alleged. Whether there is any great medical virtue in bezoar, or whether there is none, is a question that will probably be decided in time; but to settle the point it is necessary to examine and test the true Chinese article, which evidently cannot be sold under double its weight in gold.

The Chinese also import a considerable quantity of Indian Cow Bezoar. This, after transport to China, is only worth about 8*s.* to 9*s.* an ounce, or barely one-twentieth that of the genuine native article, which we have no hesitation in asserting to be one of the dearest drugs in existence. Beargall is another expensive animal product, being commercially worth some 16*s.* an ounce in Shanghai; but for what medical purposes it is used we are unable to state. All we know is that it forms a part of the Chinese *materia medica*, the same as do the ordinary vegetable nutgalls, with which the country-side everywhere abounds.

Beeswax plays a by no means unimportant *rôle* in Chinese medicine, forming the base of most ointments and plasters, in the manufacture of which an enormous quantity is annually consumed. So vast, indeed, is the consumption of beeswax for this purpose that one is inclined to join the good Dominie in crying "Prodigious!" That the Chinese should elect to use beeswax as the base for their ointments is somewhat curious, seeing how many other equally suitable substances are to be found within the borders of the empire.

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* From a paper in the *Medical Press and Circular*, September 13.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 30, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE FUNGI SEASON.

AT this season of the year one is forcibly reminded of the truth of the old saying, "A little knowledge is a dangerous thing." Owing partly to the fashion for fungus forays and partly to the publicity given by newspapers to the fact that other species of fungi besides the common mushroom are edible, the impression has gone abroad among those who cultivate a superficial knowledge of science, that many species of fungi can be eaten with impunity, while the fact is ignored that poisonous species often so closely resemble the edible ones that they can only be distinguished by those who have seen both. Persons reading that the champignon (*Marasmius oreades*) grows in open pastures straightway draw the conclusion that all fungi growing in pastures are wholesome, collect and eat *Agaricus semilanceatus*, or perhaps a dangerous *Hebeloma*, and pay the penalty of their rashness. Unfortunately the penalty is often severe, as in the recent case of an English clergyman in France, whose lamentable death from eating a poisonous species comes as a timely warning at a time of year when fungi are most abundant.

Perhaps no nation eats so few fungi as the British; certainly none is more careless in ascertaining the characters by which edible species may be distingushed from poisonous ones. But forewarned is forearmed, and the simplest way to prevent these constantly recurring accidents would probably be to teach in schools the means of distinguishing the edible and poisonous species and the danger of experimenting with all others. The number of edible fungi occurring in our woods is estimated, by Dr. BADHAM, at thirty species, and the number being so limited, it would be just as easy to teach the young how to discriminate the wholesome from the dangerous as it is to teach them how to distinguish the different chemical compounds in common use. At all events there are probably more deaths caused every year by poisonous plants than by poisonous drugs accidentally administered, and if the latter deserve the attention of Government the former ought not to be altogether ignored.

In other countries legislation has been enacted to prevent the frequent occurrence of poisoning by fungi. Thus, in Rome, as long ago as 1837, an Inspector of Fungi was appointed by Government to examine every morning all the fungi offered for sale. This official had powers to direct that all stale fungi left from the preceding day, as well as all that were mouldy, maggoty, or dangerous, including any specimen of the common mushroom, should be sent under escort and thrown into the Tiber; also to fine or imprison anyone not complying with the Government regulations. In a country where a city of 154,000 inhabitants consumed yearly between 60,000 and 80,000 pounds weight of fungi, such regulations were indeed requisite. But the very fact of such an enormous consumption of these plants shows that the want in England of a practical knowledge of this class of plants deprives the poor of a considerable amount of cheap, and, if properly inspected, wholesome food, no country being richer than our own in esculent fungi.

Practical instruction also in the characters of the more dangerous poisonous plants cultivated in gardens or growing wild in this country might well replace a great deal of the botanical knowledge of much less real value at present taught and required in science and other schools. Mezereon and yew would then be not so likely to tempt children with their bright-coloured berries, nor would aconite be mistaken for horseradish; neither would some of our leading daily papers make the mistake of including species not yet recorded as British (*e.g.*, *Agaricus Cæsareus*) among the edible fungi of this country.

On the Continent and in China and Japan dried fungi are largely used, and doubtless there is less risk in eating these than in eating fresh fungi, the poisonous principle probably undergoing decomposition. In some cases the kitchen fire will render fungi which are acrid when raw, innocuous when cooked; this is the case with some of the species yielding a milky juice. In others the poison is extracted by immersing the fungus, before dressing it, in vinegar or brine, the liquid then containing the poison which was originally in the plant. This was known to the Greeks, who said, "Prepare your funguses with vinegar, salt or honey, for thus you will rob them of their poison." The practice is still continued in Russia, where many species reputed to be poisonous are eaten with impunity after having been soaked in vinegar before being cooked. We know, however, very little concerning the influence of climate in developing poisonous principles in this class of plants. Aconite is said to be eaten without danger in some parts of northern Europe, and it is a recognized fact that many plants are less poisonous in the north than in the south of Britain. And the mushroom, which is wholesome in this country, is reckoned poisonous in Italy.

It is very easy to mistake the poisonous *Amanita phalloides* for the edible *A. rubescens*, or the orange-coloured false chantarelle (*C. aurantiacus*) for the delicious *C. cibarius*, especially if a cold in the head prevents the delicate apricot odour of the last from

being perceived. The downy margin and white milk of the very poisonous *Lactarius torminosus*, also, are not likely to be noticed by anyone unacquainted with this plant, which bears a strong resemblance to the esculent *L. deliciosus*. No one, therefore, even though he may know the edible species well, should attempt to experiment on those differing from them in even the most trifling particulars. The pleasure to be derived is not worth the risk.

Those who wish to enjoy eating fungi with safety should follow the practice of the Italians, and cultivate known species. *Agaricus caudicinus* is thus grown with but little expense or trouble. The pollard head of the black poplar tree is brought home, watered freely for the first month, and in a short time becomes covered with abundant specimens of the above species, and the block continues to yield for twelve to fourteen years. *Polyporus avellanus*, an excellent species to eat, is grown on stumps of the cobnut tree, which are singed over a little burning straw and then watered plentifully. In about a month the perfectly white fungi, each about 2 to 3 inches in diameter, appear so profusely as almost to hide the wood from which they spring. It is said that *Boletus edulis* can be grown by watering the ground in suitable places with an infusion of the spores. It should not be forgotten that fungi, especially fleshy ones, decay very rapidly, and that a species which may be good eating at noon may undergo such changes in a few hours as to be anything but good eating at night.

Good service might be done to science, and possibly many a valuable life might be saved, were the poisonous principles of the different groups, such as *Russula*, *Lactarius*, *Boletus*, etc., isolated and examined by chemists, and their physiological action investigated by medical men. Unfortunately, even the antagonistic action of belladonna to muscarine, and possibly to the poisonous group to which *Amanita muscaria* belongs, appears to be so little known that it is hardly ever tried as an antidote, whilst our knowledge of other poisonous principles of fungi is almost *nil*.

PROSECUTION FOR COUNTER PRESCRIBING IN CANADA.

A CASE of prosecution for counter prescribing is reported from Ottawa, which is of a somewhat unusual character. It appears that the defendant, a Mr. MORTIMER, who is described as "an old and respected druggist," had a physician's prescription presented to him to dispense, but instead of doing so, he informed the patient that he could give him something better, and on the strength of that statement sold to the patient a preparation of his own. This led to his being summoned to appear before a police magistrate on a charge of giving advice without being a licentiate of any medical college. In defence Mr. MORTIMER pleaded that what he had sold was a specialty, and that he had given his advice gratis, which he claimed anyone had a right to do; further he alleged that he had acted similarly for thirty-five years previously and that it was only what every druggist in the Dominion was in the habit of doing. The magistrate, however, held that the law had been broken, and fined the defendant twenty dollars and costs. With rather mistaken zeal a local newspaper took up the case of the druggist, and in "spread eagle" diction championed the right of the public to free trade in medicine. But the *Canadian Pharmaceutical Journal* very properly remarks that the magistrate's decision was alike in accordance with law, justice and common sense, since Mr. MORTIMER decidedly overstepped his position as a druggist and had no right whatever to substitute any preparation for that named in the prescription. Moreover our contemporary expresses the opinion that every druggist in the province will repudiate the assertion that he is in the habit of doing as Mr. MORTIMER has done.

THE OPENING OF A NEW SESSION.

THE first week in October is in London always noticeable for the opening of schools and the delivery of "introductories." First among them in point of interest to pharmacists stand the proceedings in connection with the School of Pharmacy in Bloomsbury Square. The new session commences, as will be seen by the official advertisement, on Monday, October 2, with the lectures on Chemistry and Pharmacy by Professor REDWOOD and the instruction in Practical Chemistry under the supervision of Professor ATTFIELD; whilst on Thursday, the 5th, Professor BENTLEY will commence his lectures on Botany and Materia Medica. It is to be hoped that a good number of pharmaceutical students will avail themselves of the opportunity thus afforded them for obtaining instruction in the science of their calling. But the meeting on Wednesday evening will appeal to a larger number, since on that occasion the successful students of a past session are to be rewarded and the new comers are to be welcomed. An invitation to this meeting is extended by the Council to all students and friends, both ladies and gentlemen, and we do not doubt that, as in former years, the theatre will be well filled. After the Professors have made their reports, the prizes will be presented by the President, and then an address to the students will be delivered by Mr. JOSEPH INCE, which we do not doubt will be worthy of the occasion.

LIVERPOOL CHEMISTS' PRICE LIST.

RECENTLY we had the opportunity of calling attention to a new edition of the Price List issued by the Manchester Association, and we now have the pleasure of referring to the fifth edition of the Dispensing and Retail Price List recommended by the Committee of the Registered Chemists' Trade Association of Liverpool. The acceptability of this little work is proved by the fact that four editions have been exhausted in less than seven years, and additions and improvements have been made in the present edition which it is hoped will make it even more useful. We presume that copies may be obtained from Mr. J. HOCKEN, the Honorary Secretary to the Association.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Concluded from page* 259.)

The following papers were then read—

Note on Methyl Orange as an Indicator of Free Acid.

BY B. S. PROCTOR.

Dr. Lunge, in an article in the *Chemical News*, December 16, 1881, advocates the use of methyl orange (sulpho-benzene-azo-dimethylamine), as an indicator in alkalimetry. I have found it useful also as an indicator of the presence or absence of free acids in salts, which in their normal condition have an acid reaction with litmus.

One grain of the dye in a pound of water makes an orange-yellow test liquor, two or three drops of which added to 1 ounce of water give it a yellow tint, which is changed to pink by a very small trace of free mineral acid.

It is not so sensitive to oxalic acid, still less so to acetic and not at all affected by carbonic.

Ferrous Sulphate.—The yellow liquor is not coloured pink by a solution of pure ferrous sulphate though the change is at once effected by a trace of free sulphuric acid in the presence of the sulphate.

With Perchloride of Iron the indications are not so satisfactory; the colour is deepened but the reaction is not clearly marked when neutrality is disturbed by additions of hydrochloric acid or ammonia.

Alum.—Pure or commercial alums do not change the colour of the orange, though they strongly affect litmus; a trace of free sulphuric acid added in the presence of the alum at once changes the orange to pink. Ammonia being added to this pink liquor promptly rendered it yellow and turbid; dilute sulphuric acid being then added drop by drop with an interval, and constant stirring, each drop produced an instantaneous tint of pink, which gradually changed back to yellow, as the acid was neutralized by the alumina in suspension; when the successive additions of acid had dissolved nearly all the alumina, the restoration of the yellow colour became very slow, finally the pink colour appeared permanent before the last traces of the alumina had dissolved.

Sulphate of Zinc.—1 ounce of water, 1 grain of sluphate of zinc, 4 drops of test liquor, remained faint yellow and changed to pink on the addition of $\frac{1}{4}$ of a drop of dilute sulphuric acid. On adding ammonia and acid the reactions were similar to those obtained with alum.

Repeating the test with sulphate of zinc to ascertain its delicacy, 1 ounce of water with 1 drachm of sulphate of zinc, and 4 drops of the test liquor, remained faint yellow, but changed at once on the addition of 0·08 of dilute sulphuric acid.

Organic Acids.—The action of organic acids though not so sharp as that of the mineral acids, is as clear as with most of the indicators in use.

With 1 ounce of water and 5 drops of test liquor, a small fraction of a grain of tartaric or citric acid sufficed to develope the pink colour. One drop of B.P. acetic acid produced the change, but 1 drop of vinegar strength did not produce a pink colour, though there was a change in that direction. In the liquor thus tinted by acetic acid, $\frac{1}{100}$ of a grain of sulphuric acid at once developed the pure pink colour.

Bicarbonate of Lime.—Water tinted pink in this way is very sensitive to ordinary hard water, and might probably give a fair approximation to the degree of temporary hardness in a water free from alkalies.

Chloride of Zinc produces no change of colour.

Corrosive sublimate causes a tinting towards pink, which is removed by the addition of chloride of ammonium.

Boracic Acid causes no change.

Cream of Tartar gives a tinting towards pink which is not much altered by small additions of caustic potass, or by tartaric acid, nor even by small additions of hydrochloric acid, until the addition probably left some free hydrochloric acid in the solution.

Hydrocyanic Acid produces no change even when present in nearly full pharmacopœia percentage, but the addition of a fraction of a drop of dilute hydrochloric acid developed the pink colour in a solution containing more than a drachm of the B.P. hydrocyanic acid.

Arsenious Acid has no action on the colour even on boiling for some minutes with the reagent.

Sulphurous Acid in small quantity produces the red coloration and does not bleach it when added in large excess.

Superphosphate of Lime does not cause reddening unless there is more phosphoric acid present than is requisite for retaining the lime in solution.

Note on a Commercial Sample of Liquor of Iodide of Iron.

BY B. S. PROCTOR.

If I had had a vote in establishing the laws of nature, I should probably have arranged that ferrous iodide should not have a propensity to absorb oxygen, liberate iodine, or behave in any other unsightly way on our shelves, and so I should have earned the thanks of all good pharmacists.

There has been evinced in our body a chronic desire to circumvent the nature of iodide of iron; and every now and then we have been promised by some maker, or someone who has devised a new formula, that we should at last be relieved of the hitherto troublesome changeability of iodide of iron or its syrup.

To my mind it does not appear probable that the *same* material should possess different properties when made by different processes, and if it were possible to obtain the same material endowed with different properties by deviating from the B.P. process, I should say that deviation ceased to be legitimate.

Holding these views I have not been very prone to accept the unchangeable iodides, but in a weak moment I was tempted to buy a little "Liq. Fer. Iodidi," which I was assured by the maker was not prone to darken, and could be made into a syrup of full Pharmacopœia strength by mixing with simple syrup as wanted; and which I was also assured I might examine as I liked and would find nothing but the legitimate iodide of iron and water.

I noted his words and concluded that it contained some preservative which he felt safe to promise me I should not find; perhaps he counted on my not carrying out my suggestion to examine it.

The first thing I noted was that it was freely acid, it not only reddened litmus more than solution of iodide of iron made by the B.P. process, but it also reddened methyl orange (sulpho-benzene-azo-dimethylamine) which is not acted upon by pure iodide of iron.

Sulphuretted hydrogen, when passed through the liquor, caused no change except the slow precipitation of white sulphur, which would result from the presence of a small quantity of a ferric salt, or a little sulphurous acid. The same reagent produced a small black precipitate, with the pure neutral solution of iodide of iron. The commercial liquor was free from odour of sulphurous acid and from appearance of oxidation. The reaction suggested that oxidation might have been masked rather than prevented. It also suggested that the ferric salt, if present, might be the oxalate, which is green and of such a pale tint as not to be visible in the blue-green of the iodide.

As a check to this surmise a little ferric oxalate was added to a portion of liquor of iodide of iron and it developed a little yellowness which again disappeared on

heating with a little free oxalic acid, the original blue-green colour being restored.

I do not find, however, that oxalic acid has any specially protective power.

The presence of a little sulphurous acid, too small in quantity to be readily detected either by odour or reagents, would probably account for all the unchangeableness noticed, but would not account for the acidity of the liquor.

Phosphoric acid, having a reputation of preserving the presentable appearance of the liquor, was also sought for, and its presence proved by separation as ferric phosphate, and confirmed by precipitation as ammonio-magnesium phosphate.

After most of the experiments had been tried I noticed a small precipitate at the bottom of the bottle, which had previously escaped my notice from the dark blue colour of the glass.

This precipitate, removed and washed, proved to be ferrous oxalate, as its lemon-yellow colour at first suggested.

Half a fluid drachm of the liquor, precipitated with nitrate of silver, indicated gravimetrically 13·47 grains iodide of iron, instead of 17·2, which was required to make a full strength syrup when the liquor was used according to the directions accompanying it.

A trace of sulphuric acid was found, but only such as might represent a little hard water, or the product of the oxidation of sulphurous acid. A trace of hydrochloric acid also, but too small to have any significance.

I do not profess that this is an exhaustive examination of the sample; my object was gained when I ascertained that its permanence was not the result of purity, not attained without a sacrifice of purity. I do not suggest the propriety of adding any foreign matter as a preservative. I have not even suggested the impropriety of such a course; but I do suggest that if any pharmacist feels himself impelled to any other expedient than that of keeping his solution in contact with an iron wire, he had better at least know what he is doing. Add the adulterations yourself rather than buy the liquor ready adulterated and not know what it contains.

The President, in proposing a vote of thanks to Mr. Proctor, said there had been so much said and written on the subject of solutions of iodide of iron that he need not say anything to stimulate discussion upon it. This last note on methyl orange as an indicator seemed particularly useful and it would be well if they had a similar series of experiments made with phenol-phthalein. Litmus really seemed to have too much its own way in this matter of acid and alkaline reaction; they had been using the terms acidity and alkalinity for so many years that they had got into the way of thinking that those were definite properties of a substance, whereas really all they were doing was speaking of the qualities of that substance in terms of litmus. He did not see why they should not speak of them in terms of phenol-phthalein or of methyl orange. If they did so they might even get nearer to truth repecting acidity, alkalinity, and neutrality.

Mr. Ekin said the use of these bodies as indicators was first brought into notice in this country by Dr. Witt some years ago. He advocated the use of what was known as Tropœoline O.O., which had very much the same chemical composition as methyl orange, the methyl being replaced by the phenyl group and it was more stable. Professor Lunge, in the article in the *Chemical News* referred to, had claimed that methyl orange was more delicate as an indicator, which was doubtful, and one of his statements that it was not affected by acetic acid, as Mr. Proctor had shown and he could confirm, was decidedly erroneous. He had sent Mr. Proctor a sample of Tropœoline O.O. to try against the methyl orange, and he had heard from him that he had not had time to try it properly, but he fancied it gave a purer red with acid and purer yellow with alkali, but was not quite so delicate.

Mr. Fletcher said no meeting of the Conference could be considered complete without the question of iodide of iron coming up, and when he saw Mr. Proctor's paper on the list, he had the curiosity to turn up some old volumes of the *Pharmaceutical Journal*, and in ten minutes he counted no less than forty-two papers on the syrup and liquor of iodide of iron. Dr. Thompson, in 1834, first suggested iodide of iron as a medicine, and, rather curiously, it was introduced first as a liquor. It was made official in the old Edinburgh Pharmacopœia, the strength being that of the present syrup, viz. 4·3 grains of ferrous iodide to the fluid drachm. In 1836, Mr. Squire, for even then this solution did not seem to have been quite immaculate, suggested that when dispensed it should be sent out with a coil of iron wire traversing the whole length of the solution. In 1842, Dr. Thompson read a paper at an evening meeting of the Society, when Mr. Savory was in the chair, and he seemed to have thrown cold water on the suggestion, for he said that having prescribed the solution of iodide of iron for a lady patient, she gravely wrote to ask him whether the iron screw which the bottle contained was to be swallowed whole, or taken in parts after each dose of the mixture. Dr. Thompson then recommended the syrup of iodide of iron, and suggested the very formula which has remained without alteration to the present time. He (Mr. Fletcher) had noticed that whenever this question came up, some gentleman always rose and said he was surprised that there should be any bother about making syrup of iodide of iron; that he was always able to make it perfectly colourless and keep it. The very fact that such a number of papers had appeared in the Journal upon it, was pretty good evidence that the majority did not find it satisfactory. He felt a little delicacy in offering any remarks on Mr. Proctor's paper, partly because that gentleman was a much more experienced pharmacist than he was, and he also feared that as a manufacturer of iodide of iron his remarks might be misinterpreted; still he should like to say a word upon it purely from a chemical point of view. If there was one thing about making iodide of iron, which he had hoped had been thoroughly settled, it was that when iodine and iron were brought together in the presence of water hydriodic acid was developed. That had been proved to demonstration over and over again, and if the solution were distilled very large quantities of hydriodic acid might be got from it. If iodine and iron were boiled together in water and the solution afterwards boiled up with more iron there would be very brisk effervescence, which showed that there was free acid in the solution. That could be proved by distilling and precipitating the hydriodic acid as a silver salt. Mr. Proctor took exception in the first place to the solution because it was very acid; but he was open to challenge Mr. Proctor, or any other pharmacist, to make any solution of iodide of iron which should not be very acid when tested; at all events he would challenge him to make one which would not contain hydriodic acid. Then Mr. Proctor said he found ferrous oxalate. The wholesale druggists and manufacturing chemists had not had a very good time of it at this Conference, but he really thought that no manufacturing chemist or wholesale druggist would have the hardihood to introduce such a poisonous substance as oxalic acid into a medicinal solution, if he had any reputation he cared to lose. With regard to sulphurous acid, he would only say that if anyone wanted to try and keep a solution of iodide of iron by sulphurous acid, he had better try it; it would give a thick muddy deposit and do all sorts of other disagreeable things. The suggestion of preserving the solution by phosphoric acid was due to an ex-President of the Conference, Mr. Groves, some years ago, and at the Swansea meeting, he recollected an admirable little paper, by Mr. Groves also, in which he suggested that if coloured syrup of iodide of iron were treated with a few drops of liquor potassæ, the colour would

disappear, and if a little phosphoric acid were then added it would keep very well; and he concluded with the very sensible remark that of two evils he preferred to choose the lesser. He could not help regretting that Mr. Proctor was not present to answer any questions. He did not make any mention of the specific gravity of the liquor, which was in itself an indication of its strength. Further than that, he said that he separated phosphoric acid as ferric phosphate; but if phosphoric acid were really there, and he had a ferric salt there, he should imagine the ferric phosphate would already have come down. Mr. Proctor maintained, in the early part of the paper, that it was illegitimate to add anything whatever to a pharmaceutical preparation, whether it was faulty or perfect; but he recollected, at the London meeting of the Conference, Mr. Proctor read a paper on hydrocyanic acid, wherein he recommended the addition of some mineral acid to preserve it, and at another meeting, Mr. Williams recommended the addition of glycerine. The question for pharmacists was whether they should send out syrup of iodide of iron of all sorts of colours, or whether they should modify the process, as it was evident the Pharmacopœia never intended to have hydriodic acid present, and send out a preparation, which was always perfectly white and good and which no one could complain of.

Mr. Williams said his recommendation was not that glycerine should be added to hydrocyanic acid by chemists without authority, but that it might be added as a preservative by the authorities of the Pharmacopœia. He never presumed to say that a chemist should add glycerine on his own responsibility.

Mr. Fletcher said in the course of the paper he referred to, he believed Mr. Williams said that no chemist, whoever he was, would be able to make hydrocyanic acid to keep without the addition of some trace of mineral acid, and in the place of mineral acid he recommended glycerine.

Dr. Symes said Mr. Fletcher had rather sat on those chemists who had said that syrup of iodide of iron by the Pharmacopœia process could be made to keep without some preservative being added to it; he happened to be an individual who, on more than one occasion, had said that. He did not believe even in Mr. Proctor's suggestion of adding iron wire. The syrup properly made and put in small, well-filled, stoppered bottles, exposed to a strong light, kept well. A liquor which kept well under almost any conditions was an undoubted convenience to many chemists and deserved to be appreciated, but the syrup prepared from it and that by the Pharmacopœia process should not differ.

Mr. Parker wished to say one word in support of Dr. Symes. He had in his possession a specimen of syrup of iodide of iron, prepared according to the British Pharmacopœia, which had remained unaltered for two years and a half. The only precaution he took was to fill the bottle so as to entirely exclude air. To his mind the use of a "liquor" was, in many cases, very convenient, but he doubted whether it would be so in the case of this syrup, where the difficulty in dispensing small quantities, say a drachm, or ½ a drachm, would be very much increased if one-eighth the quantity had to be measured. The only excuse he could see for a pharmacist using liq. ferri iodid. for the preparation of the syrup was from his being unable or finding it very inconvenient to prepare and store the syrup properly.

Professor Tichborne quite agreed with the remarks made by the last speaker. In giving a history of the syrup of ferro-iodide Mr. Fletcher was not quite correct in some respects. As far as he recollected the history of syrup of ferro-iodide, the first improvement suggested was the use of iron wire, which he (the speaker) strongly objected to as he did not think the wire preserved it at all. The next improvement was suggested by himself many years ago, in a paper read at Bloomsbury Square. In that paper it was pointed out that up to that day the proportion of sugar was not sufficient; by the formulæ used up to that date a very thin syrup was produced, and one of the essential points of his (the speaker's) paper was to propose that the ferro-iodide should be run into a supersaturated syrup. Such a syrup, according to his experience, kept perfectly well. Hydriodic acid was formed in making iodide of iron in the first instance, but the amount formed would depend a great deal on the boiling, and the error which was implanted in the student's mind by the direction of the Pharmacopœia was that he did not boil the iodide of iron enough. The direction was that when the yellow froth became decolorized the iodide of iron was supposed to be formed. That, however, was not a measure of the completion in the operation, and there was no doubt at that stage a considerable amount of free hydriodic acid present. If the boiling were continued for a considerable time the hydriodic acid would be brought down to a minimum, and that was one of the secrets which made the difference between a well prepared and a badly prepared syrup.

The next paper read was—

Report on the Strength of Commercial Samples of Tincture and Liquid Extract of Opium.

BY JOHN WOODLAND, F.L.S., F.C.S., ETC.

Having, during the past year, made several determinations of the strength of different samples of these two preparations of opium, I submit a compilation of the results of these and other estimations in the form of a paper to the members of this Conference.

From the variation in strength of the samples of opium used in pharmaceutical operations, a divergence in the results was anticipated and experienced, and in the present state of pharmaceutical progress such variation ought not to exist, and might be remedied.

Regarding morphia as the chief of the active ingredients of opium, and the assaying of this alkaloid an operation attended with no very great difficulty, I do not see why the samples, as they are wanted for use, should not be estimated, and having an official standard of say 8 or 10 per cent. (one or the other) of morphia, a mixture of the various samples made, which would bring the whole to this standard.

Many samples of best Smyrna opium contain 12 or even a greater percentage of this alkaloid; in such a case allowance could be made for the excess over the standard; for instance, a sample of opium is found to contain 12 per cent. of morphia, and a gallon of tincture is required; if the standard be 8 per cent. and the proportions of drug and spirit the same as now exist in the Pharmacopœial formula, 12 ounces will be necessary, but in the present case 12 per cent. being contained, either a gallon and a half can be made with 12 ounces of this opium, or 8 ounces can be used to prepare a gallon.

It may be urged that the other principles contained in opium are of physiological value in the administration of the tincture, and therefore they ought to be estimated as well; but whilst their number is so great, and isolation tedious, I do not see that it would be practicable, the estimation of morphia only being sufficient for all practical purposes. The following is a table of the percentages of solid residue and morphia obtained from fourteen samples of tinct. opii procured from both London and provincial chemists:—

No. of sample.	Character of residue.	Percentage of residue.	Percentage of morphia.
1.	Resinous	4·35	·62
2.	Resinous	3·21	·41
3.	Resinous	3·93	·45
4.	Oleaginous	4·81	·38
5.	Resinous	4·22	·61
6.	Resinous	4·51	·59
7.	Resinous	5·01	·68
8.	Resinous	3·56	·32

No. of sample.	Character of residue.	Percentage of residue.	Percentage of morphia.
9.	Resinous	3·41	·45
10.	Resinous	4·67	·70
11.	Resinous	3·82	·51
12.	Oleaginous	5·11	·41
13.	Resinous	4·28	·65
14.	Resinous	4·54	·69

The samples were evaporated at a temperature of 70° C. in an air-bath, and when perfectly dry treated by a modification of Prollius's method for the estimation of morphia as follows. The solid residue was taken up with ten times its weight of equal parts of rectified spirit (60 over proof) and water, to this solution enough liquid ammonia was added to render it strongly alkaline, and then an equal bulk of ether was introduced, and having well shaken the mixture it was set aside for twenty-four hours, after which the crystalline morphia was collected, washed with ether, dried and weighed.

One or two blank experiments were made with a known quantity of morphia in solution by which the accuracy of this method was demonstrated, the difference between the quantities introduced and estimated being extremely slight.

Allowing that the opium from which the tincture is made contains the maximum percentage of morphia mentioned in the Pharmacopœia, viz., 8, the percentage of this alkaloid in the tincture will be about ·6, hence in six of the samples examined an over percentage was found, whilst in eight a deficiency existed, the lowest being No. 8.

Ten samples of liquid extract of opium were treated in a similar manner to those of the tincture, viz., evaporation to dryness, and the subsequent estimation of morphia in the residue. The following table indicates the results :—

No. of sample.	Percentage of residue.	Percentage of morphia.
1.	4·47	·37
2.	3·39	·21
3.	4·45	·30
4.	4·71	·36
5.	3·11	·19
6.	3·40	·23
7.	4·92	·37
8.	4·21	·31
9.	3·85	·21
10.	3·02	·22

On calculation it will be found that if a sample of opium contains 8 per cent. of morphia, the liquid extract made from this sample should contain ·38 per cent. of this alkaloid, but in each of the above instances the percentage was too low, especially in the cases of Nos. 2, 5 and 9.

The PRESIDENT, in proposing a vote of thanks to Mr. Woodland, said this paper opened up the question of drug standards, which was rather a large subject. The percentage of morphia, indicated in the Pharmacopœia, which should be contained in opium was not 8 per cent., but from 6 to 8 per cent., but even assuming it was 8, it was rather curious that these samples of tincture should yield on the average apparently within 10 per cent. of that quantity, while the liquid extracts did not yield enough morphia by 25 per cent. It would seem as if the opium were very poorly extracted in the case of the solutions.

Mr. PLOWMAN said it would be useful to know on what data Mr. Woodland proceeded when he said, on calculation, it would be found, if crude opium contained 8 per cent., the liquid extract ought to contain ·38 per cent. of morphia. It could not be the same in every case.

The last paper read was—

REPORT ON THE PURITY OF COMMERCIAL SAMPLES OF SILVER SALTS.

BY JOHN WOODLAND, F.L.S., F.C.S., ETC.

I was led to make the following analyses partly by seeing on the green paper issued by the Conference Committee that such a report was wanted, and partly on account of curiosity, awakened by seeing various sized caustic points sold for the same price, and after obtaining a large caustic point for a small piece of money, came to the conclusion that the maker, fearing that the caustic point might prove too strong, with due regard to the tender feelings of the public modified its action by the aid of a diluent. The diluents found in the two forms of nitrate of silver, viz., caustic points and crystals, were the nitrates of potash and soda, those of potash being chiefly present, as the following table will show :—

Caustic Points.

No. of Sample.	Percentage of $AgNO_3$.	Name of Diluent.	Percentage of Diluent.
1	63	Potassium nitrate	36
2	71	Sodium ,,	26
3	64	Potassium ,,	35
4	75	Potassium ,,	25

Crystals of Silver Nitrate.

No. of Sample.	Percentage of $AgNO_3$.	Name of Diluent.	Percentage of Diluent.
1	89	Potassium nitrate	10
2	99	None	—
3	92	Potassium ,,	8
4	84	Sodium ,,	14
5	80	Potassium ,,	19
6	100	None	—

In the estimation the points and crystals were reduced to powder and dissolved in recently boiled distilled water, to which a standardized solution of pure cyanide of potassium (prepared from an alcoholic solution of KHO) was added until the precipitated cyanide of silver at first formed was exactly dissolved, the data being derived from this equation—

$$2KCN + AgNO_3 = AgCN,KCN + KNO_3$$

It may be noticed that the above figures do not in every case aggregately come to 100, the deficiency in number being due to a slight amount of moisture present. Crystals of nitrate of silver when pure are transparent, and an impurity can usually be told by its giving a translucent appearance, and so causing them to somewhat resemble the crystals of chlorate of potash. The impurities in the above samples were estimated by precipitating the silver as chloride with hydrochloric acid, filtering, and evaporating the filtrate and weighing the residue.

The other salt of silver estimated was the oxide, most samples of which had been in stock for some time. Six samples furnished the following table :—

No.	Percentage of Silver.	Corresponding Percentage of Oxide.	Impurities.	Percentage of Impurities.
1	76	81	Carbonate and chloride of silver	19
2	70	75	Siliceous matter	25
3	81	87	Carbonate and chloride of silver	13
4	72	77	Carbonate and chloride of silver	24
5	78	83	Carbonate and chloride of silver	17
6	69	74	Carbonate and chloride of silver	26

The samples of oxide were estimated by dissolving in nitric acid, precipitating with hydrochloric acid, washing, fusing, and weighing the residue. The presence of carbonate and chloride with the oxide of silver seems to indicate that either solution of potash or soda is used in its preparation, instead of lime water as officially ordered, as carbonate and chloride are to be found in both of these solutions. The siliceous matter is undoubtedly an intentional adulteration.

The PRESIDENT, in proposing a vote of thanks, remarked that caustic points did contain nitrate of potassium, because nitrate of silver was too brittle to be used alone in the small cases. He believed that all makers put in some nitrate of potassium. Crystals of nitrate of silver certainly should not contain potassium or sodium nitrate or chlorate of potassium either. As for the oxide there could be no doubt that if precipitated with the common soda it might contain carbonate, but not if precipitated with pure soda.

Professor QUINLAN said the addition of potassium nitrate to pencils of nitrate of silver was perfectly recognized and necessary. Nitrate of silver of itself was too brittle, particularly when applied to the throat and parts where it would be liable to drop down. It was a great advantage to the practice of surgery to have these neat little points, compared to the trouble of grinding away with a wet cloth at a stick of nitrate of silver, which the surgeon used to have to do before the points were brought into the market. He need not say that nothing would justify the addition of extraneous matters to silver nitrate crystals.

Mr. MASON said he did not know whether Mr. Woodland stated the source from which he obtained some of these samples, but he did not think it possible that such nitrate crystals came into the hands of chemists and druggists. Photographers were in the habit of buying up waste from which they recovered nitrate of silver, and probably some dealers in photographic chemicals might be tempted to adulterate it in this way. Respecting the oxide of silver, he believed as a matter of fact it was not sold pure, for being in want of some absolutely pure some months ago, he wrote to a large manufacturer for it who replied that he should have to make it for him. He ultimately received a small quantity in a moist state, and was told that he could not be supplied with it dry.

Professor TICHBORNE said oxide of silver was a pharmaceutical preparation and there should be no difficulty in procuring it at any house, retail or wholesale.

Mr. WILLIAMS said the tough nitrate of silver, made specially for surgical purposes in points, contained as a rule nitrate of lead, not nitrate of potash, as the former toughened it much more than the latter. It was not put in as an adulteration and was allowed for in the price charged for the article. It was a special thing, known as toughened nitrate of silver, at least so he understood, for he did not make it himself. He was certainly very much astonished to hear of the impurities found in the crystallized nitrate of silver. He had had a great deal of experience in this article for many years and knew it was not always pure, and the commercial article was not as pure as it might be; but it could be purified, and was all the better for being recrystallized and purified again and again. Still he did not imagine that the impurity was above $1\frac{1}{2}$ or 2 per cent. at the most, and he did not believe any photographer would purchase an impure nitrate of silver; photographers knew perfectly well what nitrate of silver should be and would not purchase it twice if it were impure.

Mr. NAYLOR said he had examined commercial nitrate of silver by means of a standard solution of chloride of sodium on various occasions, but had not found it to contain more than $1\frac{1}{2}$ to 2 per cent. of impurity.

Mr. ANDREWS said that after the remark made about oxide of silver, which, to the dispenser, was of even greater importance than the nitrate, he was in hopes that some of the practical manufacturing chemists would say whether there was such an amount of impurity as was stated. It was a powerful remedy when used in small doses, and if adulterated to such an extent it would be a very serious matter. Mr. Williams said the oxide of silver in commerce generally contained a certain quantity of chloride. It was perfectly certain that pure caustic soda, absolutely free from chloride, was never used in practice for precipitating the oxide, and, therefore, as the caustic soda would contain a percentage, not very large, of chloride, so the oxide of silver would probably contain a little chloride too. That would explain why Mr. Mason could not obtain chemically pure oxide of silver except by special order. The idea of throwing it down by lime water, which was suggested in the paper, was one which was not recommended in any works on the subject, although of course it would be very effective. The difficulty was that the lime water held so small a quantity that it would take a large bulk of water to effect the object.

Professor TICHBORNE said the lime water was the Pharmacopœia process.

Mr. GROVES said on one occasion the presence of carbonate in oxide of silver was manifested to him by the swelling and effervescence of some pills that he was making. The oxide of silver became reduced to the metallic state, carbonic anhydride was given off and the pills became very large. On examining the specimen of the oxide he found it contained a large proportion of carbonate.

PLACE OF MEETING IN 1883.

The PRESIDENT said the next business before the Conference was to appoint a place of meeting for the year 1883. Usually the Committee had been able to announce that the British Association would meet in such and such a town, and it had been the practice for the Conference to meet in the same place. On this occasion, however, this could not be done, because Oxford, which was the place chosen by the British Association for 1883, had sent word to that body that owing to some unforeseen circumstances it would not be able to entertain the British Association next year, and it was not at that moment decided where the British Association would meet. A question might arise whether the Conference should necessarily meet in the actual town in which the British Association met, but unless it really was important to go into that question, he hoped it would not be raised. It was quite a distinct question, the Committee decided it a year or two ago, and for the present, at all events, it was undesirable to alter the rule of meeting where the British Association met. That practice had been carried out with one single exception, which was perfectly justifiable, ever since the Conference was formed. He held in his hand an invitation from the Oxford chemists which was everything the Committee could wish, but he would suggest that the members should leave it to the Committee to decide at an early meeting where the Conference should meet in 1883.

Mr. GROSE (Swansea) then moved that the place of meeting for 1883 and the selection of local officers be left to the Executive Committee.

The motion was seconded by Mr. DEAN and carried unanimously.

OFFICERS FOR 1882–83.

The Conference then proceeded to elect the officers for the ensuing year, Messrs. Robinson and Clark (York) being appointed scrutineers of the ballot papers.

The following officers were unanimously elected:—

President.—Prof. Attfield, Ph.D., F.R.S., F.I.C., F.C.S.

Vice-Presidents.—M. Cartcighe, F.I.C., F.C.S., London; J. R. Young, Edinburgh; C. Umney, F.I.C., F.C.S.

Treasurer.—C. Ekin, F.C.S., Hounslow.

General Secretaries.—F. Baden Benger, F.C.S., Manchester; S. Plowman, F.I.C., London.

Other Members of Executive Committee. — Alexander Kinninmont, F.C.S., Glasgow; J. C. C. Payne, Belfast; W. A. H. Naylor, F.C.S., London; R. Chipperfield, Southampton; P. W. Squire, F.L.S., F.C.S., London; G. S. Taylor, F.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton; F. W. Fletcher, F.C.S., London.

Auditor.—James Spearing, Southampton.

VOTES OF THANKS.

Mr. WILLIAMS said it was with great pleasure he rose to propose a resolution, which he was sure all present

would cordially agree with. It was one proposed every year, and it would be almost impossible to find fresh language proper to such an occasion; but fortunately it was not necessary that much should be said. He was quite sure the gentlemen on whose behalf he was going to move the resolution would take his words as expressing the very cordial feeling which the meeting had towards them. It was—

"That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, and especially to Messrs. Randall, Chipperfield and Dawson, for the very successful manner in which the various arrangements connected with the Southampton visit had been carried out."

He would not add one single word, except to say that he considered the meeting had been an exceedingly good and successful one.

Mr. GILES seconded the motion with very great heartiness. He said the pleasure they had all felt in receiving the hospitality and attention of the local members had been greatly enhanced by the courteous personal attention they had received at the hands of those gentlemen who had been named. He and many others met an old friend in Mr. Randall, whom he was glad to see as Chairman of the Local Committee. He had had great pleasure in meeting Mr. Chipperfield and making his acquaintance, and he could not help saying, as a good many others felt, that he regretted that it should be necessary on these occasions to have a Treasurer at all, whose duties must be somewhat severe. They could not help feeling while they were receiving such friendly attention they were also imposing considerable liabilities on their friends, who so kindly and cordially entertained them; but these things could not be helped, and he only trusted that those gentlemen received some satisfaction from them, as they were told, on the highest authority, that it was more blessed to give than to receive.

The motion was carried unanimously.

Mr. RANDALL, in reply, said it was very common to say that one felt more difficulty in speaking on such an occasion than on almost any other, and it was perfectly true, but he might be allowed to say that the members of the Local Committee were greatly obliged to all the members of the Conference for the kind way in which they had received all their efforts and overlooked their shortcomings. When a thing of that sort had to be done just for once, no one could do it so well as if it had to be done frequently. Southampton could not say, as York said through its representative standing in the position he now occupied, that it was essentially a city of the past; it could not aspire to be a city at all and it would not wish to look back; if it could it would rather be an aspirant to future progress. Southampton burst its stone-bonds, of which they saw the relics in the gates and some of the walls, about the seventeenth century and went out into the open and had been going on increasing ever since. It was only that year that Southampton burst what they considered a very serious iron bond and was now looking forward to the north to help them by coming down more readily, as it would have two ways instead of one of doing so, and assisting by its enterprise and commerce and science too. He believed science nowaday did more to help commerce and enterprise than it ever did before. The pharmacists of Southampton, of course, hoped that they would participate in the general improvement in commerce, which they looked for as these things went on, and he heartily thanked the Conference for giving them some hints at least towards improving pharmacy as an art, and especially as a science. If, therefore, the visiting members had received a little hospitality in that which was material, they in the district had gotten a great deal more in that which was far better, which he hoped they would make use of in the future. In the name of the Local Committee he begged to express their high appreciation of the way in which their endeavours to promote the comfort of the visitors had been received.

Mr. CHIPPERFIELD said he was no orator or else perhaps he might express himself in such a manner as would startle the meeting. He was a bad hand at whistling and was especially disinclined to attempt whistling before he was through the wood, and they had still to look forward to the morrow. He was happy to believe that they were satisfied that the local chemists had been doing what Nelson told his sailors England expected them to do,—they had striven to do their duty. *A propos* of what Mr. Randall had said, he might add that he had felt very strongly indeed during the last twelve months the truth of the poet's lines which he learnt in his youth,—he had not read much of that author's poetry in his maturer years,—that—

"A man must serve his time to every trade,
Save censure; critics all are ready made."

His share of this work had been done during his apprenticeship, and the same with his *confrères*, and the shortcomings which no doubt had been noticed and would still be witnessed must be placed to that account. He felt that by the next night he should have thoroughly served his time at this business, and that if they could only persuade the Conference to come again next year they should then be able to do the work well; at any rate he believed he should do his part then perfectly. At present he could only say he had done it to the best of his ability.

Mr. DAWSON also thanked the Conference for the acknowledgment which had been given for the slight trouble he had taken and the services he had been able to render to the gentlemen attending the Conference. When the matter was first mooted it was with considerable fear and trembling that he took the office of Local Secretary, but since then he had scrupulously attended to all the minor details he possibly could with the view of rendering their visit as pleasant and comfortable as possible. He hoped the gentlemen attending the Conference would carry away with them as pleasant reminiscences as the pharmacists of Southampton would retain of the visit of the Conference.

Mr. CHIPPERFIELD asked leave of the President to add a word or two which a sense of duty compelled him to utter. He hoped no one would go away and fancy that the hospitality they had received, and would still receive, came exclusively from Southampton. They had to thank almost every town in the county for its kind assistance, and also several gentlemen residing in other places, such as Salisbury, London, Redhill, Cheltenham, Shepton Mallet, and elsewhere. He mentioned this so that any town which perhaps might be as poor as Southampton and might, therefore, not be able to entertain the Conference, might follow the example of Southampton, and gain that extraneous aid which would enable them to do the same as had been done for seventeen or eighteen years.

Professor TICHBORNE said they would all feel that this was what might be termed in the annals of the Pharmaceutical Conference, a red letter meeting, and, individually, he should take this opportunity of thanking the local gentlemen for the reception they had given him as a stranger amongst them. The success of that meeting so far had been perfect, and although they felt deeply indebted to the local men for that success, they knew also that it was almost impossible, even for local men, to make these meetings successful, unless they had support from the authorities and other general assistance. Everybody who had been at the Ordnance Survey Office must have felt that it was a great treat; in fact, it was an unique exhibition. He was informed that the zinco-lithography, which was now so universally used, to which they owed cheap music and many other things, was chiefly due to the Ordnance Survey Office of that town, that it was invented and perfected there. It therefore possessed a peculiar interest, and very properly the people of Southampton were very proud of it. It would

be wrong, therefore, if they separated without passing such a resolution as he was about to move, namely—

"That the best thanks of this Conference be given to Major-General Cooke, the Inspector-General of the Ordnance Survey Department, for his kindness in affording the members facilities of visiting the Ordnance Survey Office."

Dr. SYMES seconded the motion. He said every one who had visited the office and seen the processes employed would be impressed with the thoroughness of the work which was done there and the science which was brought to bear in carrying it out.

The motion was put and carried unanimously.

Mr. ATKINS then moved—

"That the hearty thanks of the members are due and are hereby tendered to the President for the courteous and very able manner in which he had conducted the business."

He said there was a danger that he might weaken the force of these well selected words by any ill selected words of his own, but he could not allow the resolution to pass without expressing his own personal feeling with regard to it. He had been most solicitous, coming from a neighbouring city which could hardly venture to hope to have the honour of a visit from the British Association or the Pharmaceutical Conference, that this Southampton meeting should be a great success and that desire had been amply met. He did not know that there had been the slightest thing to mar their enjoyment excepting a little wet weather; the room in which they had met, the admirably representative gathering of those assembled, and the character of the papers would all render the meeting memorable. It was an important thing to have a good President, and though he wished to make no comparisons he ventured to say they had never had a better. Professor Attfield had this disadvantage that he had a great reputation and a man who had a great reputation had to work up to it, as a beautiful woman had alway to keep up to the report of her beauty. Professor Attfield had excited great expectations and he had realized them. He had given an address of which he ventured to say yesterday that the highest compliment he could pay to it would be that it would excite attention and possibly criticism. Besides that there fell upon him in his office as President the duty of seizing the salient points of all the papers and presenting them in clear, accurate language to the meeting, and he need hardly say to do that required many gifts, large reading and much knowledge. In addition to the address and in addition to presenting the points of the paper he had, with all the courtesy and consideration possible (barring that one matter of the vital force), allowed the widest latitude to discussion. They would all look back with pleasure to this Southampton meeting, no small part of the success of which was due to the fact that Professor Attfield had been President.

Mr. STEPHENSON had much pleasure in seconding the motion. As a delegate, with Mr. Borland, from the northern division of the United Kingdom, he could only say that as far as he was concerned he had felt it was his part to listen rather than to speak.

Professor QUINLAN said it would not be fitting if no voice from Ireland were raised to support this resolution on an occasion when the Conference was presided over by a gentleman whose work on chemistry was the standard book in the Irish medical schools. This would be always regarded as a red letter meeting of the Conference, partly from the admirable way in which Professor Attfield had presided, and partly from the kind and generous hospitality received from the Southampton members, which none would ever forget.

The motion was put by Mr. SCHACHT, and carried by acclamation.

The PRESIDENT, in responding, thanked the members for the kind way in which they had shown their appreciation of his humble endeavours to fulfil the duties of President. The secret of his apparent success, and he must admit it had been a success, after what had been said, was chiefly that he had profited by the example of his predecessors, and not only his predecessors in that chair, but, Mr. Stephenson and Mr. Atkins would allow him to say, of other Presidents and other Vice-Presidents also, connected with the Conference and with the Pharmaceutical Society. He thanked his colleagues, the previous Presidents, for their kind support during this meeting, and he thanked all the other officers too, and he was sure the officers generally would excuse him if he especially thanked the Secretaries for their labours in carrying on the business of the sittings. He must also thank the authors of the numerous papers; they had seldom had a larger number of more practical papers. He must recognize, too, the kindness of so many gentlemen who had contributed to the discussion of the papers, and it was particularly gratifying to him to find amongst the authors of papers and the speakers so many of his old pupils. He was particularly pleased to have met them, and he thanked them for coming. He had been glad to meet at Southampton members whom he had not met before. He was particularly glad to have met so many of the friends he had made at the meetings of the Conference, during nineteen years, and including Newcastle, twenty consecutive years. He thanked the members very much for the kind way in which they had passed this resolution and, in conclusion, could assure them that he would do his best to promote the interests of the Conference during the coming year.

Reviews.

DICTIONARY OF ECONOMIC PLANTS. By JOHN SMITH. London: Macmillan and Co., 1882.*

Visitors to the Kew Gardens or to other botanical gardens, who notice in the economic houses the names of plants, of the uses of many of which they are entirely ignorant, would probably be glad of a handbook to which they could refer and in which they might find a short and popular account of the uses and native countries of the different plants. To help the inquiring mind seeking such information few are perhaps more competent than Mr. J. Smith, seeing that he was officially connected with the Royal Gardens at Kew for over forty years and that the economic collections which now fill the three museum buildings there were formed during the time that he filled the post of curator to the gardens. His son, who was the first curator of the museums at Kew, worked most industriously, until his death in 1865, with the view of writing a work on economic and commercial botany. From his arranged notes, which occupied no less than thirty octavo volumes, the materials for the present work have been selected by his father. To give some idea of the number of subjects treated of in the book, it is stated in the preface that 1600 are mentioned belonging to 1163 different genera.

The selection of material seems to have been carefully made with a view to throw light upon the names and nature of such economic objects as might be met with in commerce, in agriculture, in general reading, in gardens, and in museums. The character of the book may be compared with that of the 'Treasury of Botany,' but it is written in a more popular style, and as it forms one volume only it is more convenient for carrying and for reference. It also has the advantage that while the vernacular or commercial names are arranged throughout the work in alphabetical order, there is in addition an index of scientific or botanical names at the end.

Looked at from a pharmaceutical point of view, a large number of interesting products are mentioned, and the omissions are but few. Among the latter we observe that Goa powder does not receive any notice, although better known in this country than pituri, to

* Demy 8vo; pp. i.-ix.; 1-457. 14s.

which a paragraph is devoted, and although *Jacaranda* is mentioned no notice is taken of the medicinal value of the leaves. Ceylon and Bengal cardamoms, which are not unfrequently imported, are not described or noticed under the head of "Cardamoms."

The omissions, however, are evidently very few, and in another edition will doubtless be rectified, should it be revised by Mr. J. R. Jackson, the present able curator of the Kew Museums, to whom the author expresses his indebtedness in furnishing many new subjects and in correcting proof sheets.

Mr. Smith's complaint against popular names for plants, such as Adam's needle, Job's tears, Jacob's ladder, as being vulgar and undignified, may be almost regarded as a protest against the exercise of the imagination, a faculty too little exercised, probably, in this practical age. Certainly the term crane's bill instead of geranium and stork's bill instead of pelargonium can scarcely be more vulgar than the scientific names derived, as Mr. Smith informs us, from the Greek words *geranos*, a crane, and *pelargos*, a stork.

The difficulty in compiling a work like the present must have been in reducing the materials at hand into the small space of an octavo volume and to weigh the relative importance to the public generally of the kind of information to be given concerning each subject. Mr. Smith may be congratulated on having produced a work which will be found useful alike in the household library, in the day school, as a handbook of economic botany to the student visiting economic museums, and to the merchant who wishes to find out the value and uses of imported vegetable products.

New Commercial Plants and Drugs. No. 6. By Thos. Christy, F.L.S. London: Christy and Co. 1882.*

Most persons who are interested in materia medica are cognizant of the valuable services rendered during recent years by Mr. Thomas Christy, whose commercial instincts have led him in a direction where it is to be hoped he has secured personal advantages for himself as it has certainly enabled him to confer benefits upon the community. For directly a new drug from any part of the globe has been mentioned, or a plant that promised to be of economic value, Mr. Christy's energy has been exerted to place it with the least possible delay within the reach of those who wished to test it; indeed he has frequently done his best to create a demand for it by placing at the disposal of those likely to be interested the best available information upon the subject. Although this may be a form of advertising, it is of a very superior character, and is serviceable to more than the advertiser. To these efforts are due the publication of a series of reports on new commercial plants and drugs, the sixth of which is the subject of this notice.

The greater portion of the present number is taken up with a treatise on fibres, their botanical sources, the methods of examining them under the microscope, and their treatment by the Ekman process. The treatise is illustrated by six coloured plates, containing figures and sections of various fibres drawn by M. Vétillart, the French authority on the subject, who has assisted Mr. Christy with his experience, and it contains a large quantity of valuable practical information, although not as a rule put before the reader in the most elegant style. Whilst the work was being prepared, Mr. Christy became acquainted with Ekman's process for the separation of vegetable fibres, which seems likely to exercise an important influence upon the future at least of paper-making. It consists in boiling the substance containing the fibre under pressure in water containing sufficient magnesium or other soluble alkaline sulphite to prevent oxidation of the organic matter. The treatment completely dissolves the incrusted substances and the cellulose is said to be thus separated in a practically pure condition, retaining its fibrous form and uninjured in strength, whilst the dissolved incrusting substances form a by-product that should possess some value. The success of the process in the preparation of wood pulp for paper-making renders it useless, in Mr. Christy's opinion, to search for vegetable fibres to compete with it for that purpose. The reader has, however, an opportunity of forming an independent judgment, as the different sheets of the number are printed on varieties of paper made entirely from wood prepared by this process.

The latter portion of the number is devoted to notes on new plants and drugs and their uses.

* Royal 8vo; pp. i.-vi.; 1-86; plates I.-VI. 2*s.* 6*d.*

Correspondence.

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

Leeches.

Sir,—I am pleased to find that Mr. Hart and "Observer" coincide somewhat with my views, and I wish to relate my experience of leech keeping during my first year of apprenticeship, which is now eighteen years ago.

We had tried several methods of keeping them in a bell-shaped aquarium, various plants having been supplied by leech importers; we had to change the water every other day, sometimes oftener; the water would get quite a green tinge and very foul, the shingle at the bottom would have to be well washed to free it from smell. The loss of leeches was very great.

At my suggestion, we adopted a plan which succeeded fairly well, necessitating the water to be changed once only in two or three months. It consisted of a piece of perforated zinc, in the form of a half circle with a rim of the same, to the depth of 1 inch, which was filled with earth, and small ferns placed in the same with moss packed between to hide the earth and zinc. In the bottom of the aquarium was a layer of shingle and on this three stones about 5 or 6 inches in length, placed in such a position to support the zinc and its contents. Water was then poured in to just reach the zinc by a ¼ of an inch. In a few days the rootlets of the ferns found their way through the perforated zinc, and touched the water; I imagined that this kept the water good for the time mentioned. At this time I had little or no knowledge of leech breeding, and on going to the aquarium one day and on examining some of the ferns I was surprised to see something like a piece of wet sponge. I took it out and cut it open and found that it contained either four or six young leeches (I cannot quite recollect the exact number). We discovered several after this. I would also state that I have frequently noticed little insects darting about in the water, and at such times have found the leeches very healthy.

Devonport. J. A. Lamble.

Junior.—Certainly you did wrong. Liq. hydrarg. perchlor. is not a simple solution of hydrarg. perchlor.

Nectandra.—Use the ordinary tests for distinguishing between potash and ammonia.

A. B.—We cannot undertake to recommend particular houses of business.

F. J.—You are recommended to consult some technical work on the subject.

W. H. B.—Wild cherry bark, bruised, 2 ounces; proof spirit, 20 ounces: digest for fourteen days, express, and filter. Or the tincture may be prepared by percolation. See also a paper on *Prunus Virginianæ*, by Professor Bentley, in *Pharm. Journ.*, [2], v. 105.

Chemicus.—(1) The tincture prepared according to the formula given by Dr. Fleming in his treatise on *Aconitum Napellus* is nearly six times stronger than the official tincture. (2) "Dialysed iron" is ferric oxide in a soluble form.

Communications, Letters, etc., have been received from Messrs. A. H. Mason, J. G. Fowler, P. MacEwan, P. Davidson, W. Robertson, The Leeds Chemists' Association and the Chemists and Druggists' Trade Association.

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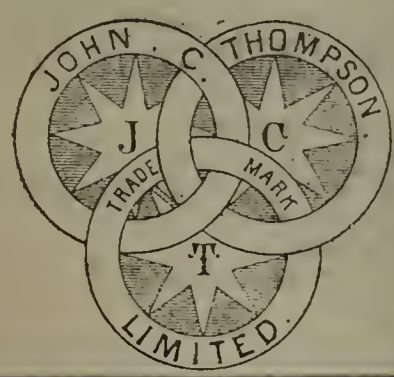

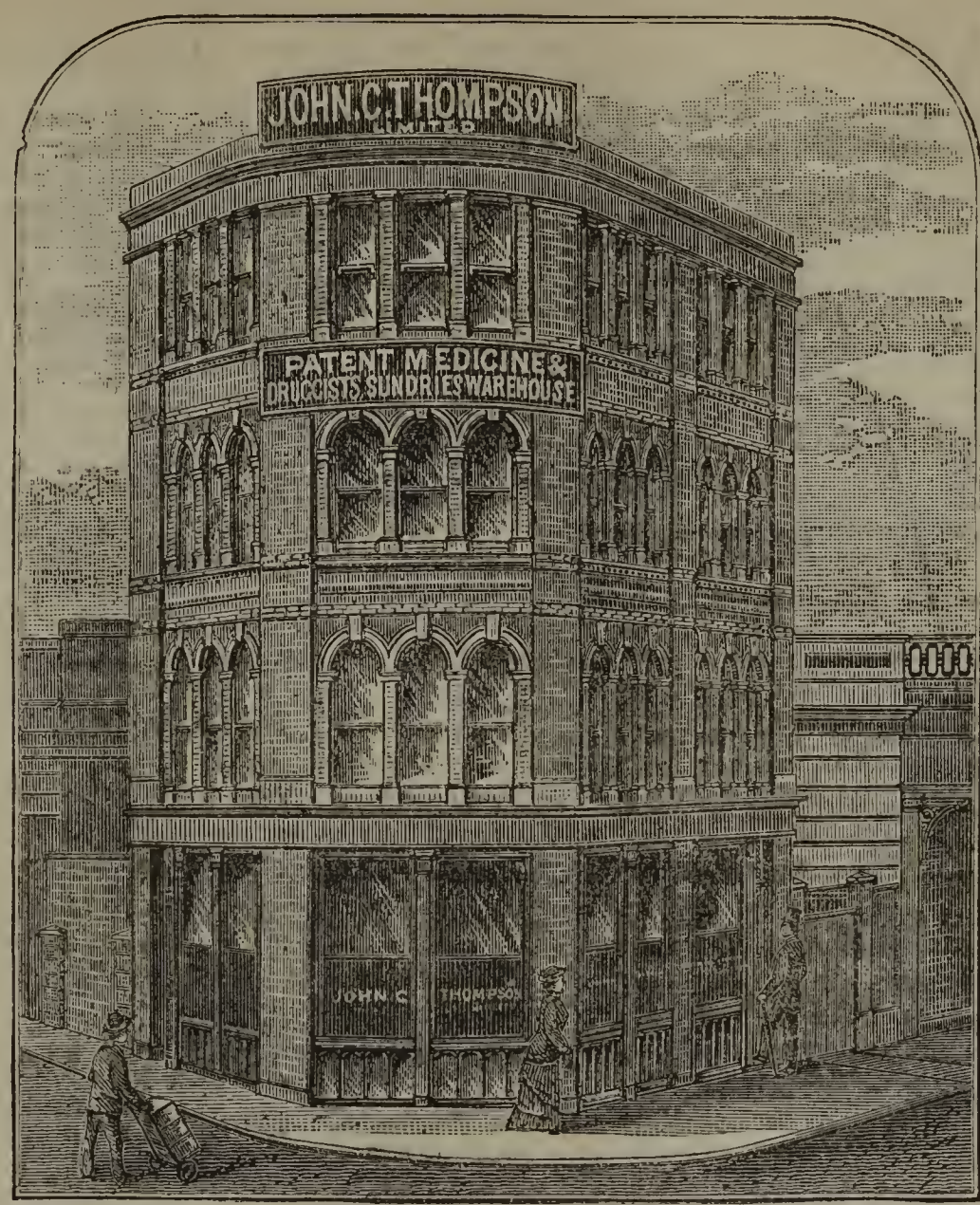

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WINTER SESSION, 1882—83.

The WINTER SESSION will be opened on WEDNESDAY, 1st NOVEMBER, at 3 p.m., with an Introductory Address by Dr. McVail.

Anatomy, Descriptive, 11 a.m.
,, Demonstrations, 2 p.m.
Practical Anatomy, 9 a.m. till 4 p.m. } A. Ernest Maylard, M.B., B.S. Lond.
Chemistry, 10 a.m.—J. M. Milne, Ph D.
Physiology and Histology, 1 p.m.
Practical Physiology, 3 p.m. } W. Limont, M.A., M.B.
Surgery, 12 noon—D. N. Knox, M.A., M.B.
Medicine, 11 a.m.—D. C. McVail, M.B.
Materia Medica and Therapeutics, 3 p.m.—Neil Carmichael, M.D.
Midwifery and Gynecology, 12 noon—W. L. Reid, M.D.
Medical Jurisprudence, 4 p.m.—Eben. Duncan, M D.

SUMMER SESSION.

Anatomy, 11 a.m.
Practical Anatomy, 8 a.m. till 4 p.m. } A. Ernest Maylard, M.B., B.S. Lond.
Practical Chemistry, 10 a.m.—J. M. Milne, Ph.D.
Practical Physiology, 3 p.m.—W. Limont, M.A., M.B.
Operative Surgery, 1 p.m.—D. N. Knox, M.A., M.B.
Midwifery, 12 noon—W. L. Reid, M.D.
Practical Pharmacy, 11 a.m.—Neil Carmichael, M.D.
Public Health, 2 p.m.—Eben. Duncan, M.D.

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MEDICAL OFFICERS AND LECTURERS.

Consulting Officers—Dr. Chambers, Sir James Alderson, M.D., F.R.S., Mr. Lane, Mr. Spencer Smith, Mr. J. R. Lane, Mr. White Cooper.
Physicians—Dr. Handfield Jones, F.R.S., Dr. Sieveking, Dr. Broadbent.
Physicians in Charge of Out-Patients—Dr. Cheadle, Dr. Shepherd, Dr. Lees.
Surgeons—Mr. Haynes Walton, Mr. Norton, Mr. Owen.
Surgeons in Charge of Out-Patients—Mr. Page, Mr. Pye, Mr. A. J. Pepper.
Physician-Accoucheur—Dr. Alfred Meadows.
Physician-Accoucheur in Charge of Out-Patients—Dr. Wiltshire.
Ophthalmic Surgeon—Mr. Anderson Critchett.
Aural Surgeon—Mr. Field.
Surgeon-Dentist—Mr. Hayward.
Medical Tutor—Mr. Pepper.
Other Lecturers—Dr. Wright, F.R.S., Dr. Randall, Mr. Mivart, F.R.S., Rev. J. M. Crombie, Mr. Malcolm Morris.

The course of teaching at this School ensures careful and complete preparation for all the Examining Boards, the Public Services, and the higher University Examinations. Special instruction is given to Students preparing for the Examinations of the University of London.

The MEDICAL TUTOR assists the Students in their Clinical Work and in preparing for the Final Examinations, so that the training of every individual Student is supervised. Ophthalmic, Aural, and Dental Surgery, Comparative Anatomy, Histology, and Pathology, are carefully and systematically taught both by Lectures and Practical Demonstrations. There are also departments for the Diseases of Women and Children, of the Eye and Ear, of the Skin, and of the Throat.

SCHOLARSHIPS.

Two Scholarships of the value of £150 and £100

These Scholarships are awarded every year by open competition in Natural Science previous to entrance at the School.

A Scholarship of £20 in Anatomy.

A Scholarship of £40 in Pathology, carrying with it the appointment of Assistant-Curator.

These are awarded annually.

PRIZES.

Prizes are given in each class at the close of every Session.

APPOINTMENTS.

Four House-Surgeoncies, each tenable for one year.
A Resident Obstetric Assistantship, tenable for six months.
These Resident Medical Appointments are open to the Pupils without expense of any kind, and are equivalent to Four Scholarships of the annual value of £50.

For the Prospectus apply to
A. B. SHEPHERD, M.D., Dean of the School.

WILLS' UNIVERSAL POSTAL SYSTEM.

NOTICE TO PRELIMINARY STUDENTS.

We are astonished to find that so many failures still occur in the Preliminary Examination of the Pharmaceutical Society, after the enormous expenditure which has been incurred in producing such a thorough course of teaching as the Universal Postal System. In July last, 370 Candidates presented themselves, of whom 181 failed. Had these rejected candidates been through a course of instruction under this system, the probability is that two-thirds of them would have passed.

As we never publish the List of Candidates who pass by this means, Students are unable to judge of its usefulness, we can therefore only refer them to numerous successful Students, and to the press, of which the following is an extract:—

The Magazine of Chemistry and Pharmacy.—"Probably the young man who is an assistant, or apprentice, some hundreds of miles from London, will declare with a regretful sigh that he cannot afford the time or the money to come to London and study, and that he has no means beyond his own personal efforts therefore to rely on. We should cordially sympathise with this person, because we feel sure he would never be successful, did we not know that he has an all-sovereign balm for his woes at hand, obtainable for the expenditure of a mere trifle, and therefore leaving it simply his own fault, and deserving it, if he blindly labours on in ignorant darkness. Mr. Wills, of Westminster College, one of our most thoroughly successful 'tutors,' extends him a helping hand. We cordially advise a trial of Mr. Wills' principle, and we have every confidence the essayist will not be disappointed.

FEE, 10s. 6d.

BEWARE OF IMITATIONS.

For Syllabus and testimonials, apply (enclosing stamp) to Messrs. WILLS & WOOTTON, Westminster College, Trinity Square, London, S.E.

St. Thomas's Hospital Medical School,

Albert Embankment, London, S.E.—The WINTER SESSION of 1882-83 will COMMENCE on October 2, when an INTRODUCTORY ADDRESS will be delivered by Dr. SHARKEY, at Three p.m.

Two Entrance Science Scholarships of £100 and £60 respectively, open to all first year Students, will be offered for Competition. The Examination will be held on the 4th, 5th, and 6th of October, and the subjects will be Chemistry and Physics, with either Botany or Zoology, at the option of candidates.

Special Classes are held throughout the year for the "Matriculation," "Preliminary Scientific," and "Intermediate M.B." Examinations of the University of London.

All Hospital Appointments are open to Students without extra charge.

Scholarships and money prizes of considerable value are awarded at the sessional examinations, as also several silver and gold medals.

The fees may be paid in one sum or by instalments. Special entries may be made to Lectures or to Hospital Practice, and special arrangements are made for Students entering in their second or subsequent years, also for Dental Students and for qualified Practitioners.

Several Medical Practitioners and private families residing in the neighbourhood receive Students for residence and supervision, and a register of inspected and approved lodgings is kept in the Secretary's office.

Prospectuses and all particulars may be obtained from the Secretary, Dr. Gillespie.

W. M. ORD, M.D., Dean.

The London Hospital and Medical

College, Mile End, E.—The SESSION 1882-83 will commence on Monday, October 2, 1882, when an Introductory Address will be delivered at the College by Jonathan Hutchinson, Esq., F.R.S., Senior Surgeon of the Hospital, at 8.30 p.m., to be followed by a Conversazione, to which all past and present Students are invited. FOUR ENTRANCE SCHOLARSHIPS, value £60, £40, £30, and £20, will be offered for competition at the end of September to new Students. Fees for Lectures and Hospital Practice, 90 guineas in one payment, or 100 guineas in three instalments. All resident and other Hospital appointments are free. The resident appointments consist of Five House-Physicianeies, Five House-Surgeoneies, and One Accoucheurship; Two Dressers and Two Maternity Pupils also reside in the Hospital. Special entries may be made for Medical and Surgical Practice. The London Hospital is now in direct communication by rail and tram with all parts of the Metropolis.

MUNRO SCOTT, Warden.

THE MASON SCIENCE COLLEGE,

BIRMINGHAM.

The NEXT SESSION will commence on Tuesday, October 3, 1882.

The Calendar, containing full information as to the Classes, Fees, &c., is now published by Cornish Brothers, New Street, Birmingham, price 2s.; by post, 2s. 4d.

GEO. H. MORLEY, *Secretary.*

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. BAXTER, Secretary.

TERMS FOR ADVERTISEMENTS

IN THE

PHARMACEUTICAL JOURNAL.

GUARANTEED CIRCULATION

7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, as also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6d. Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

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Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

J. & A. CHURCHILL, 11, New Burlington St., London, W.

THE MANCHESTER COLLEGE OF PHARMACY,

225, OXFORD STREET, MANCHESTER.

Principal: Mr. W. S. TURNER, Pharm. Chemist, M.P.S.

Fee for instruction from now to December, Minor Examination, Nine Guineas.

Board and lodging can be obtained on the usual terms, in REGISTERED HOUSES.

TESTIMONIAL, April, 1882.—The success of the m n sent up by you is in itself sufficient testimony of the excellence of your system, and I shall never hesitate in recommending your school to any who are anxious to pass without the suspicion of a cram."—A. T. J., London.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

THE

WESTMINSTER COLLEGE

OF

Chemistry & Pharmacy,

TRINITY SQUARE, LONDON, S.E.

The next Course will commence on Friday, October 27th.

FEES.

Until the December Examination	£4 4s.
Until the January ,, ...	£8 8s.
Until Qualified (Minor)	£10 10s.
Until Qualified (Minor and Major)	£15 15s.

Students are strongly advised to enter at the commencement of a Course of Lectures. Gentlemen desirous of entering should send in their names as early as possible, as there will be only a few vacancies.

N.B.—Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

There will only be four vacancies in Mr. Wills' House for Resident Students after the October Examination. Early application is required.

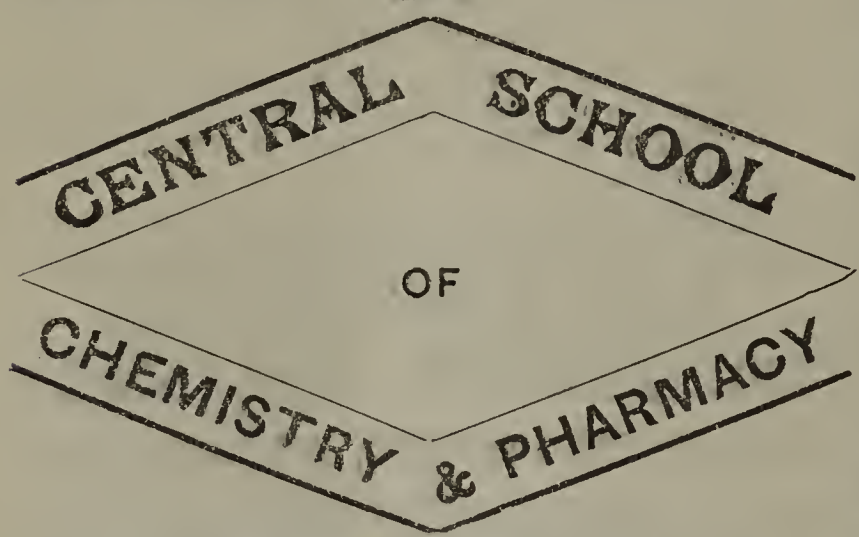
PRELIMINARY EXAMINATION.

Students are quickly and thoroughly prepared for the above Examination. The next Course of Classes will commence on Monday, October 9th.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

THE



Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The next **complete** Course of Lectures will commence on Monday, Jan. 1st, 1883, but a **short one**, embracing all the principal facts, will be held from Monday, Oct. 30th, to the December Examinations. The fee for this short course is **4 guineas**, and it is especially recommended to candidates who have already undergone a course of study and wish to complete their education under a system that will the best ensure their success. Candidates are requested to bear this fact especially in mind, viz., that most of the Students of this School pass the **first time** of their presentation. For Prospectus, apply to

Messrs. LUFF & WOODLAND.

MINOR & PRELIMINARY.

TULLY'S Postal System is the most successful method of preparing without leaving business. Fee—MINOR, One Guinea. PRELIMINARY, 10s. 6d. Send stamped envelope for particulars and *original Testimonials (not Copies)* to Mr. J. TULLY (Hills Prizeman), Chemist, Tunbridge Wells. Established 1872.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(From the Royal School of Mines),

130, CAMDEN ROAD, N.W.

Enclose stamp for terms and particulars.

Laboratory close to Gower Street Station.

ENGAGEMENTS WANTED.

AS DISPENSER to Surgeon. 7 years' experience. Age 21. Can Extract Teeth, &c. Would keep books if required. Highest references. J. W. KNOWLES, Thorne, Doncaster.

BY Chemist, of good experience in Prescribing and good establishments. Permanency. MANAGER or DISPENSER. Reference highest order. Locum Tenens till permanently engaged. ALPHA, 3, Effra Parade, Brixton.

MANAGER or otherwise. Accustomed to good class of business. Married. Total abstainer. Age 30 years. BETA, 1, Garibaldian Villas, Somerset Rd., Tottenham, Middlesex.

AS ASSISTANT, in or near London. Ætat. 25. Height 5ft. 8in. 10 years' experience. Abstainer and non-smoker. Good references. Now disengaged. G. DAUNCEY, Church St., Wottonunderedge, Gloucestershire.

LOCUM TENENS.—J. E. AGGER, Watton, S.O. Norfolk, is now prepared to take temporary management for gentlemen wishing to leave home. Can Extract and Stop Teeth.

APPRENTICESHIP.—A gentleman wishes to APPRENTICE himself to a Chemist and Druggist in the South of England. N. M., Bagwich, Godshill, Isle of Wight.

AS MANAGER. Nearly 20 years' experience in first-class town and country businesses. Good testimonials as to character and business ability. Single. F. GALL, Ripley, Surrey.

AS ASSISTANT, or to MANAGE. Age 28. Height 5ft. 11in. London and country experience. Can Prescribe and Extract Teeth. In or out-door. ASSISTANT, 23, Millbay Rd., Plymouth.

AS JUNIOR in a good Retail and Dispensing business, where 2 or more are kept. Disengaged. W. H. LYON, Alsop & Quiller, 148, Sloane St., S.W.

AS JUNIOR or IMPROVER. In London or suburbs. Age 21. Good references. W. L. D., 12, Westbourne St., Belgravia, S.W.

IMMEDIATELY, with 3 or 4 evenings weekly to attend King's College, as ASSISTANT. Age 22. Height 5ft. 9in. Excellent references and testimonials. In or out-door. MEDICUS, 28, Upper Marylebone St., Portland Pl., W.

AS MANAGER of Branch or SENIOR. Qualified by examination. 20 years' London and provincial experience in first-class Dispensing businesses. A permanency desired, but would accept a temporary engagement till otherwise suited. R. C., 9, Clarendon Ter., Maida Vale, London, W.

RE-ENGAGEMENT in a Surgeon's Retail. Accustomed to Dispensing and general routine. Age 24. Good reference. A. H., 134, Camden St., Camden Town

ENGAGEMENTS WANTED.

A GERMAN Chemist's ASSISTANT, aged 26, who has passed his examinations with high praise, and is in possession of the best testimonials from Germany, Switzerland, and Belgium, wants a situation in England. H. C., Avenue du Midi 61, Brussels.

IMMEDIATELY.—As ASSISTANT. Age 25. Height 5ft. 7in. Passed Prelim. Salary £25, in-doors. C., 9, Bishop's Rd., Paddington.

AS ASSISTANT. Out-door preferred. Age 24½. Minor and Hall qualifications. Over 2 years in last situation. D. R. T., Neuadd, Taliesin, Glandovey, R. S. O., Cardiganshire.

AS MANAGER or out-door ASSISTANT. Major qualification. Age 38. Experience and reference good. M. P. S., 168, High St., Camden Town.

A REGISTERED Chemist, aged 45, engaged in the morning, requires employment in the evening with a Chemist or to DISPENSE for a Surgeon. G. P., 51, St. Paul St., Islington.

AS JUNIOR. Age 20. Height 5ft. 8in. Passed Preliminary examination. Now disengaged. STATIM, care of J. Tully, Chemist, Tunbridge Wells.

A GENTLEMAN of experience, with unquestionable references, is open to treat for the Management of a Branch business. CHEMIST, 205, Rotherhithe New Road, London, S.E.

AS ASSISTANT. Age 22. Out-door preferred. Minor. Accustomed to good class trade. Good references. Disengaged Oct. 6th. J. B. PURVIS, 2, Albert Ter., Kilburn, N.W.

A PERMANENCY in good London business. Qualified. Good experience. ASSISTANT, 51, White Ladies Rd., Clifton.

TEMPORARY.—A gentleman, of long experience in first-class Retail (Ph. Chemist), seeks an engagement to take charge during illness or absence. Highest references. MEDICUS, 3, Chichester St., W.

AS ASSISTANT. Aged 22½. Height 5ft. 6in. 5½ years' experience in Eastbourne, Brighton, and country. Disengaged on 2nd inst. Excellent references. WALTER ADAMS, 36, Church Rd., Brighton.

AS MANAGER, in the country. By a Pharmaceutical Chemist, with London and country experience. Highest references. MANAGER, Mr. Perkins, Treffgarne, Pembrokeshire.

TO APPRENTICE a youth (in his 16th year) to a respectable Chemist, where he will have good opportunities afforded him of learning both the Wholesale and Retail branches of the business. He is well educated, intelligent and healthy. A photograph can be sent on application. WALTER CLAYTON, 4, London Rd., Leicester.

AS JUNIOR, out-door, in a good business. Good experience and reference. Age 24. W. F. P., Jameson & Co., 38, Robertson St., Hastings.

AS MANAGER, out-door ASSISTANT, &c. Disengaged. Age 28. Highest references. Over 11 years' good experience and character. Married, no family. CAPLEN, 3, St. Mark's Rd., Southampton.

AS ASSISTANT. At once. London preferred. Ætat. 21. Passed Preliminary. Had some London experience. CHEMICUS, 251, Gray's Inn Rd., King's Cross, W.C.

AN experienced ASSISTANT. As MANAGER of Branch. Town and country experience. Qualified. Single. Age 36. Highest reference. Disengaged on Oct. 6th. CHEMIST, 163, Oakfield Rd., Everton, Liverpool.

AS MANAGER, or some responsible position, by an experienced Chemist, accustomed to London and country trade. SYPHON, Pharmacist, 131, Embden St., Manchester.

ENGAGEMENTS WANTED.

THE guardians of a youth, aged 17 years, who has already served 2½ years in the business, are anxious of placing him in-door with a first-class Chemist to complete his apprenticeship. POSTMASTER, Marsden, Huddersfield.

AS out-door ASSISTANT or MANAGER. Married. Age 30. No family. Speaks French. West-end experience. ASSISTANT, 14A, Brewer St., Golden Sq., W.

AS ASSISTANT or MANAGER. Out-door. 16 years' varied experience. Aged 30. Married. Good references. J. L., Chemist, Rosliston Rd., Burton-on-Trent.

AS ASSISTANT, or DISPENSER to Surgeon or Public Institution. High references and testimonials. Age 32. MEDICUS, 9, Richmond St., St. George's Rd., S.E.

EARLY in October. As MANAGER or ASSISTANT. Out-door. Married, no family. ALPHA, 48, East Hill, Dartford, Kent.

LOCUM TENENS or Temporary ASSISTANT. By the day, week, or month. Town or country. CHEMICUS, 51, Judd St., St. Pancras, W.C.

TEMPORARY. Ætat. 30. Town or country. By day, week, or month. Thoroughly experienced in all branches. Irreproachable references. Terms very moderate. A. WOOD, 4, Woodfield Cres., W.

AS ASSISTANT or DISPENSER. Disengaged. Good references. Experience 8 years. Age 26. ETHYL, 200, Great Portland St., W.

AS ASSISTANT. Used to real first-class Dispensing. London preferred. Age 23. Good references. C. R. H., 27, Dorset St., Portman Sq., London.

ASSISTANTS WANTED.

EARLY in October.—An ASSISTANT. Age about 22. With Minor qualification preferred. Good references indispensable. Apply, stating age, height, salary, previous engagements, and enclose carte (to be returned), to I. G. ATKINSON, 2, Albert Ter., Kilburn, N.W.

ASSISTANT. About 24. In-doors. In general Retail and Counter trade. Hours, 8.30 to 8 o'clock. No Sunday duty. Apply, stating age, height, and salary also how long in last situation, and reference, J. H. & S., 33, Beech St., London, E.C.

AT once.—An ASSISTANT, age about 24, in light Retail, where 1 is kept. Must be a neat and accurate Dispenser, able to Extract Teeth and Prescribe. Unexceptionable reference required. Alternate Sundays and 1 evening a week free. Apply (personally preferred), stating full particulars and salary required, to Mr. A. J. BROWN, 55, Trafalgar Rd., Greenwich.

MESSRS. CUBLEY & PRESTON require an ASSISTANT. Out-door. Minor qualification. 4, High St., Sheffield.

AN ASSISTANT, of gentlemanly appearance and manners, with Minor qualification, and who has been accustomed to good-class Dispensing, for a select suburban business, where 1 assistant only is employed. Full particulars (with carte) to H. C. BIRCH, Upper Norwood, S.E.

AN ASSISTANT, from 25 to 30, in a mixed country business. Of good appearance and manners. An accurate Dispenser. Apply, stating age, height, and salary, enclosing photo. and giving references, to MORGAN & SONS, The Cross, Newtown, Montgomeryshire.

TO Students.—Wanted to make arrangements with a competent and gentlemanly man, accustomed to Dispensing and good-class trade, for partial services in return for board and residence. Application, giving particulars of experience and recent engagements, to E. BUTTERFIELD, 13, Hereford Rd., Bayswater W.

ASSISTANTS WANTED.

IMMEDIATELY.—An IMPROVER or JUNIOR, just out of time, in a country business. No heavy work. Short hours. Suitable for one going in for the examinations. Particulars as to references, salary, &c., to S. P., Apothecaries' Hall, Kenninghall, Thetford.

JUNIOR ASSISTANT. Last week in October. About 20 or 21 years of age. Acustomed to a Dispensing and Family trade, Hours, 8 to 7.30. Apply, with full particulars, to FROST & COPE, Chemists, Derby.

ASSISTANT. Out-door. One used to Wholesale and Retail trade. Apply, BLUNT & EVANS, Chemists, Market Place, Derby.

A COMPETENT ASSISTANT, not under 23 years of age, of good character, address, and active business habits. One desiring a permanent situation preferred. Apply personally, if possible, to Mr. BOWER, Pharmaceutical Chemist, 96, Tottenham Court Rd., W.

APPRENTICE.—A vacancy for a well educated and gentlemanly youth in a first-class Dispensing business. One who has passed or is prepared for the Preliminary. X. Z., care of Messrs. Southall Bros. & Barclay, Birmingham.

FOR a light Retail and Dispensing business. Must be an experienced Counterman and Dispenser, possessing good business abilities. No night or Sunday duty. Address, stating salary required, experience, age, height, and when disengaged, enclosing carte, if convenient, to ARTHUR BAINES, Piccadilly Bldgs., Hanley.

AN IMPROVER, about 18, for an established light business in London. Address, A. B., Messrs. Sutton & Co., 10, Bow Church Yard, London.

IMMEDIATELY.—A gentlemanly ASSISTANT, accustomed to good Dispensing business. One seeking a permanency preferred. Apply, with carte and usual particulars, JAMESON & CURTIS, Hastings and St. Leonards.

IMMEDIATELY.—A trustworthy ASSISTANT, from 22 to 26, for a light Drug business. A permanency. No Sunday work. One acquainted with Dentistry preferred. Apply, stating age, salary required and reference, enclosing carte (which will be returned), to T. C. TURTON, Howden, Yorkshire.

APPRENTICE.—E. C. LEWIN, Chemist, Market Pl., Boston, has a vacancy for a gentlemanly, well educated youth. One who has passed or is prepared for the Preliminary preferred. Terms on application.

A JUNIOR ASSISTANT. In-door. One accustomed to good-class Retail and Dispensing business, and of good appearance and address. Also an APPRENTICE. Out-door. Every facility for acquiring a thorough knowledge of the business. Full particulars to M. C. JONES & Co., 23, Bayswater Ter., W.

APPRENTICE.—A vacancy for a well educated youth in a good class Dispensing business. One who has passed or is prepared for the Preliminary preferred. Moderate premium. Apply, J. D. HARMER, Chymist, Windsor.

AN ASSISTANT, about 22. In-doors. In a Mixed country business. Must be a good Counterman and Dispenser. No Sunday duty. Apply, stating salary required, and send photo., to J. WELLINGTON, Chemist, Oakham.

AS ASSISTANT. From 25 to 30. Must be steady and a good Counterman, and have first-class references. Address or apply, G. M., Messrs. Rew & Co., 273, Regent St., W.

JUNIOR ASSISTANT, in-door, about 20 or 21, for a general Retail and Dispensing trade. Abstainer preferred, and unexceptionable reference required. Address, stating age, height, salary, &c., to A. B., care of Mr. Henry George, Priory, Newark, Notts.

ASSISTANTS WANTED.

A QUALIFIED MANAGER for a West-end business. At once. Married, without encumbrance. Well furnished apartments. Very little Sunday trade. Good salary paid to a first-class man. Apply, in the first instance by letter, to S. T., Messrs. Gosden & Son, 12, Tavistock St., Covent Garden.

PARIS. — Immediately.—A competent Dispensing ASSISTANT. Must speak French fluently. Apply personally, or by letter with photo., to PHARMACIEN, care of Messrs. Maw, Son & Thompson, Aldersgate St., E.C.

PUPIL.—There is a vacancy in an old established West-end Pharmacy for a PUPIL. He will be educated with the son of the proprietor, and have time for study, attending lectures, &c. Address, C. B. A., care of Sanger & Sons, 489, Oxford St., London, W.

IMMEDIATELY.—For Paris.—A thoroughly good English ASSISTANT. Must be very capable and of steady habits. French not indispensable. Address, by letter, W. J. RICHARDSON, 4, Grenville St., Brunswick Sq.

JUNIOR or IMPROVER. Out-door. Old established business. One studying for Minor would have time and assistance. State age, height, experience, salary expected, and give reference. SPRENT & BIDDLES, Broad St., Reading.

WHOLESALE Drug Trade.—A London firm require a TRAVELLER having a good connection with Surgeons and Chemists. Liberal salary and expenses. State full particulars to A. B. C., Messrs. Adams Bros., Bury St., London, E.C.

SOUTH France.—Early in October. A competent ASSISTANT, possessing Minor qualification, of gentlemanly presence and address, who has had some French experience. Age about 25. Full particulars, with photo., to POWELL, Pharmacien, Hyères (Var).

A DISPENSER to the Warrington Friendly Societies' Medical Aid Association. Apply, stating salary, to WM. BIBBY, Secretary, 11, New Rd., Latchford, Warrington.

THE Victoria Hospital for Children, Queen's Rd., Chelsea, S.W.—The office of DISPENSER will become vacant on October 21st. Applicants for the post must have passed the Minor examination of the Pharmaceutical Society. For particulars as to duties, salary, &c., apply to the Secretary, at the Hospital. All applications, with copies of testimonials, must be sent in on or before Wednesday, October 11th. Capt. BLOUNT, R.N., Secretary.

A GOOD situation offered to a respectable young man, sober, honest and industrious, qualified, neat and accurate Dispenser and good Salesman, with good character from last employer. Please state age, previous experience, salary, and reference, to Mr. NERHY, care of Messrs. Newbery, 1, King Edward St., London, E.C.

RANDALL & SON, Southampton, require immediately a thoroughly competent Dispensing ASSISTANT. State age, height, salary, experience, &c., with reference.

A JUNIOR ASSISTANT. Good home. Plenty of time for study. State age, salary expected, &c., R. CLAY, Chemist, Cromford.

ASSISTANT (out-door) to Manage Branch. Mixed Agricultural. Easy place, but must be pushing, strictly steady and honest. Christian preferred. Apply, ROSE, Wyley's, Coventry.

MESSRS. JOLLEY & CO., require a gentleman about 23 years old as Junior ASSISTANT. Must have had good experience in Dispensing, and have passed the Minor examination. Apply personally at 13, Curzon St., Mayfair, W.

JUNIOR INVOICE CLERK. Must write a good hand and be quick at figures. Apply by letter, CORBYN, STACEY & Co., 300, High Holborn, W.C.

ASSISTANTS WANTED.

AN ASSISTANT, with Minor qualification, accustomed to a good-class business. Age about 24. Apply, PROBYN & Co., 7, Pall Mall East, S.W.

AN ASSISTANT for Evening occupation. Must have good address, be thoroughly competent, and well recommended. Apply personally at HARTNOLL'S, 7, Tichborne St., Piccadilly Circus, W.

JUNIOR or good IMPROVER for first-class Dispensing business. Or one requiring time for study would be treated with. Apply personally, or with full particulars and carte, to HOPWOOD & SON, Richmond, Surrey.

AS DISPENSER and Second COUNTERMAN. In a select business. Must be able to give thoroughly good references as to competency and moral character. State age, height, salary, and reference, to C. BRADLEY, Market Pl., Reading.

FOR the Wholesale.—One who has had some experience in Laboratory and Coated Pill work. Give full particulars as to age, salary, and experience, to B. & B., care of Sutton & Co., Bow Church Yard.

IMMEDIATELY.—An in-door ASSISTANT, about 23, accustomed to a good-class country business. Apply, with full particulars of age, height, references, &c., to DUNHILL & STILES, Doncaster.

BUSINESSES FOR DISPOSAL.

BARGAINS.—BUSINESSES in improving neighbourhoods. Returns £9 per week. Handsomely fitted. Recently established. Price £500. Also: Returns £10 per week. Neatly fitted. Post Office. Price £400. Ill-health cause of disposal. Full particulars from C. B., 18, Great Portland St., W.

TO Medical Gentlemen, Chemists, and Druggists.—Retail, Dispensing and PRESCRIBING, of the late Dr. Price, Dowlais. A rare opportunity for an energetic young practitioner. Apply, Mrs. PRICE, 21, Union St., Dowlais, Glamorganshire, South Wales.

IN a market town in Nottinghamshire.—An old established BUSINESS. In present proprietor's hands over 37 years. Returns upwards of £2000. For further particulars apply J. MALTBY, Chemists' Valuer, Lincoln.

FAMILY, Dispensing and Prescribing BUSINESS, with large sale of Proprietary and Veterinary Medicines. In best position. Market town, West Norfolk. Returning over £1300 per annum. Principally cash, and with a net profit of over £500. Good modern shop, with plate glass front and large offices and ground at back. Rent £35 on 15 years' lease. No oil or heavy trade of any description. Price £750 all at, or £200 goodwill and valuation. Apply to M. P. S., care of J. Sanger & Sons, 489, Oxford St., W.

CARDIFF. — Goodwill and Stock of Chemist and Druggist, with good house and premises. Situated in the principal business street in the important town of Cardiff. The business to be disposed of in consequence of declining health of present proprietor. Address, Mr. C. H. SMITH, Rhondda Chemical Works, Pontypridd, Glamorganshire.

A DOCTOR, in central London, wishes to relinquish his OPEN SURGERY. Corner position and plate-glass front. Situated in a densely populated locality. Opposite a theatre. Suitable for a chemist. Fixtures at valuation. Small premium for lease. Apply, TITLEY, Chemist, Goodge St.

CHEMIST'S BRANCH. S.E. Unopposed. In vendor's hands 14 years. Good house. Easy rent. Surrounded by over 1000 new houses. Tenant entitled to Dulwich College privileges. Plenty scope for energetic man to work up neglected business. Price low. Neatly fitted shop. Decent stock. 371, Commercial Rd., E.

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MESSRS GURDEN BERDOE have for transfer:—BERKS Old established Retail and Prescribing Trade. Returns £400. Recently neglected. £250. £100 can remain. KENT. Seaside resort. Old established, well fitted Retail and Dispensing Trade. Returning £800. Through illness. £750, or offer. SURREY. Delightfully situated. Returning £950. Large house. Splendid garden. Valuable lease. Rent £30. £950. CORNWALL. Seaside. Dispensing and light Retail. Returning £500. At valuation or offer. ESSEX. Short distance from town. Returning £750. Same hands 14 years. Open to offer. DEVON. First-class Retail and Dispensing Trade. Showing £600 net profit. Through serious illness. £1300, or offer. Strictly genuine. SUBURBAN. Crystal Palace district. Showing net profit of £350. For £650. Another. Returning £1100. Trial allowed. Open to offer. LONDON, N. Rare opportunity. Owner leaving England. Returning £6 weekly. Only £140. Please apply, 30, Jewry St., Aldgate, City.

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IMMEDIATELY.—An old established Retail, Dispensing and Prescribing BUSINESS. Returns £400 to £500. Increasing. All full prices. Address, A. P. S., Messrs. Barron, Harveys & Co., 6, Giltspur St., London, E.C.

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MR. HINE GILBERT, by reason of owner retiring from business carried on in the same place for 35 years, can offer same a bargain. Trade select. Profitable. Averages £16 weekly. Shop large, commanding, well fitted, amply stocked. House commodious, with private entrance. Situation unrivalled and most healthy. Price £400. On long lease, or freehold would be sold. All particulars at 17, Hart St., Bloomsbury.

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BUSINESSES FOR DISPOSAL.

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FOR SALE, BARGAINS.

4 HANDSOME 16 gall. Carboys and Stands; 2 22in. French Jars; 10 3 gall. Carboys, 24 2 gall.; a number of Fancy Jars, fig. D, elaborately labelled, 10s. each; 24 3 lb. Blue Ointment Jars; 12 6lb. White Jars; 12 4lb. White Jars; 18 Lilac 3 lb. Ointment Jars, with japanned covers; 500 Shop Rounds, 8s. doz.; Extract Pots; a quantity Brown Jars, japanned covers; 36 1 gall. White Glass Bottles, gold labelled; Pill Machines; Brass Scales; Carboy Stands; Specie Jar Stands; a number Specie Jars, elaborately labelled, from 50s. pair; Iron Mortars; Wedgwood ditto; Glass Capped Ether Bottles; Tincture Presses; Leech Jars; 8ft. Plate-glass Case for centre of shop, similar to Maw's old list, fig. 124, £15, fitted inside with plate-glass shelves, worth double; a stout Sheet-glass ditto, £10; a number of Glass Wall Cases, bargains; a Dispensing Screen Tablet, in mahogany frame, with cornice, 40s.; an upright Case, 66in. high, 19in. wide, 70s.; a flat Plate-glass Counter Case, £5; Desk, enclosed with brass rails and ground glass, 50s.; 16ft. Sheet-glass Case for front of counter, £8; 6ft. Plate-glass ditto, ditto, £6; an upright Case for top of counter, 3ft. high, to open at back, 70s. E. NATALI, 207, Old Street.

THE entire Fittings of a Chemist's Shop, comprising mahogany fronted Drawers, with shelving over, Window Enclosure, Counters, Wall Cases, Dispensing Screen, Counter Case, upright Case and Desk, Bottles, Jars, Carboys, suitable for a shop about 18ft. deep. £35. Can be seen fitted in place after 4th October. E. NATALI, 207, Old Street.

20 FT. mahogany top Counter, £9; 20ft. mahogany front and top Counter, fitted with 20 drawers, £15; a 18ft. mahogany top ditto, £7; 8ft. ditto, ditto, fitted with 15 drawers the entire length, £6; 12ft. 6in. ditto, ditto, 24 drawers, £10; 5ft., 6ft., 7ft., 8ft. and 10ft. mahogany top Counters; a number mahogany top Cupboards; 16ft. Dispensing Counter, suitable for a dispensary, to fit against wall, fitted with sink, drawers and cupboards under, and shelving on top; a number of mahogany Nests of Drawers, 4ft., 6ft., 8ft., 10ft., 12ft., 16ft. long, with or without shelving over, glass knobs and bevelled edged labels. E. NATALI, 207, Old Street.

SPONGE Cases, fig. A 43, £5; fig. A 41, 65s.; Desk and Cases, fig. A 31, 65s.; fig. A 32, 45s.; a 10ft. 3in. bent Plate-glass Counter Case, brass frame, £9; a 9ft. 9in. ditto, ditto, mahogany frame, £8; 6ft. 6in. ditto, ditto, £7; 6ft. ditto, ditto, A 18, £7: 5ft. ditto, ditto, £6; 4ft. ditto, A 17, 90s.; 4ft. ditto, A 16, 80s.; 3ft. 6in., A 16, 70s.; 3ft. ditto, 60s.; 2ft. 6in. ditto, 50s.; 6ft. ditto, ditto, A 7, £7; 3ft., fig. A 8, 40s.; a large number of other Glass Counter Cases too numerous to mention in list; Plate-glass Dispensing Screens, 5ft. long, 6ft. long, 7ft. long, glass case at each end, with silvered glass centre, with marble slab in front, tablets on top, silvered glass backs inside cases, and fitted with movable shelves, very elaborate, £8 10s. each; a 8ft. Dispensing Screen, A 68; a ditto, ditto, 5ft. 9in.; Dispensing Screens, A 55, 5ft. long, £6; 6ft. long, £7; 4ft. 6in. long, with silvered plate-glass back inside, £7. E. NATALI, 207, Old Street, London, E.C.

MESSRS. TENCH & TAYLOR

Licensed Valuers and Agents,

WALBROOK CHAMBERS, 38, WALBROOK,

LONDON, E.C.

Have the following businesses for disposal. Further particulars and orders to view can be had on application:—

1. MID WALES.—Good class light Retail and DISPENSING, with some Dentistry. Nicely fitted and well stocked Pharmacy. Returns last year £829, and still increasing. Good 10-roomed house, with bath room. Rent £38. Price about £800.
2. DEVONSHIRE.—Old established Dispensing and light Retail BUSINESS. Returns last year nearly £1400. Handsomely fitted and well stocked. Price £1350. Bonâ fide reasons for disposal.
3. SOMERSETSHIRE.—Light Retail and DISPENSING, with Dentistry. Returns £550. Price £500.
4. LONDON, W.—BUSINESS, only opened a few months, and already returning between £4 and £5 weekly, at full prices. Price £230. A bargain.
5. LANCASHIRE.—Death vacancy. Returns average over £2000, at good profits. Price only about £1500.
6. LONDON, E.C.—Recently established Dispensing, Prescribing and Retail BUSINESS. Returns about £500. Price £400.

Gentlemen seeking investments are respectfully requested to apply to Messrs. T. & T. for their PRINTED REGISTER, which contains particulars of about 200 other businesses, ranging in price from £80 to £2500.

No charge is made to purchasers.

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York Chambers, Brazennose Street, Manchester,

CHEMISTS' TRANSFER AGENTS,

May be consulted on matters of Sale, Purchase and Valuation.

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FOR SALE.

THE Stock, Fittings, and Fixtures of a Chemist's Shop. The fixtures are of mahogany, the bottles and jars of modern shape, and are all in good condition. Can be seen by appointment. Apply to Mrs. KENT, Shirehampton, Bristol.

SPECIAL.

FOR sale.—Nine 1 cwt. casks of CHILIAN HONEY, firm and of fair quality, price 39/- cwt.; two or more casks, 38/- cwt. GENUINE BEESWAX, clean and good colour, 1/4 lb. GENUINE CRUSHED LINSEED, containing *all* the oil, crushed with new machinery from a specially cleaned seed, 18/6 cwt., bag free.

WM. KEMP & SON, Manufacturing Chemists, Horncastle.

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A GOOD-class family Retail and Dispensing BUSINESS, with good house. In the counties of Kent, Surrey, Sussex, or West of England. Returning not less than £700, up to £1200. A cash purchaser for a really genuine concern. Full particulars, in confidence, to CHEMICUS, 5, South Lambeth Rd., S.W.

Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xiii.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—In consequence of the increased demand for Mr. BRETT'S services as a Valuer, it is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

F. J. BRETT has always on his Register between 200 and 300 Businesses in all parts.

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F. J. BRETT'S practical knowledge of the trade in all its branches renders him specially adapted to act as trustee in Liquidations and Bankruptcies. Chemists in difficulties can have their affairs settled by private arrangement.

ISLE OF WIGHT.—Retail, Prescribing and DISPENSING, in fashionable watering-place. Rent low. Returns nearly £400. Price £250.

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YORKS.—Good-class RETAIL, in large town. Returns £1000; until illness of vendor, £1400. At valuation —about £700.

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Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

HENRY GADD,

Member of the Pharmaceutical Society,

Chemists' Transfer Agent and Valuer,

97, FORE STREET, EXETER.

Applications for either purchase or sale of businesses inserted in Register free of charge.

H. GADD begs to submit the following businesses selected from his Register to meet various requirements:—

Z.	Net profits £500.	Price £1400.
2.	,, ,, £650.	,, £1800.
7.	Returns £600.	,, £550.
8.	,, £650.	,, £600.
11.	,, £150.	,, £70.
14.	,, £400.	,, £350.
15.	,, £150.	,, £150.
16.	Net profit £300.	,, £600.
28.	,, ,, £400.	Valuation.
29.	,, ,, £200.	Price £300.
31.	Returns £260.	,, £250.
32.	Net profit £110.	,, £250.
34.	,, ,, £600.	,, £1600.
35.	,, ,, £200.	,, £350.
36.	Returns £500.	,, £250.
37.	,, £10 10s. per week.	Price £400.
38.	Net profit £75.	Price £130.
39.	Returns £9 per week.	Price £250.

Particulars of these and other businesses on application, per post or otherwise.

CHEMISTS' TRANSFERS.

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MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer the following businesses, particulars of which, with order to view, may be obtained on application:—

1. £1000. LONDON, S.E. Returns £1000. Price £700.
2. £600. LONDON, W. Returns £600. Offer wanted.
3. £700. LONDON (near). Returns £700. Price about £700.
4. £550. LONDON, E. Returns £550. Offer wanted.
5. £500. LONDON, S.W. Returns £500. Price £350, or offer.
6. £1000. LONDON (within easy distance). Returns nearly £1000. Price £850.
7. £1300. MIDLAND COUNTY. Mixed BUSINESS. Returns nearly £1300 yearly. Profits good. Full investigation permitted. Price required about £750.
8. £520. NORWICH. Retail and DISPENSING. Returns £520. Net profits over £200. Good house. Rent and taxes £65. Valuation if wished, or offer.
9. £1200. CHESTER. Mixed BUSINESS. Held by vendor 14 years. Returns £1200. Small Wholesale attached. Terms valuation, or an offer wanted.
10. £3000. AGRICULTURAL DISTRICT, EAST. Mixed TRADE. Returns over £3000. Held by vendor's family many years. Purchase by valuation. Particulars on application.

Other businesses, town and country. Particulars free on application.

Valuation appointments for October should be made as early as possible.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

WYE HOUSE ASYLUM, Buxton, Derbyshire, for the Middle and Upper Classes of BOTH SEXES, is beautifully situated in the healthy and bracing climate of the Derbyshire Hills, and is directly accessible by the Midland and London and North Western Railways. For terms and other particulars, address the Resident Physician and Proprietor, Dr. F. K. DICKSON.

NEW IMPROVEMENTS IN PHARMACY.

KEPLER EXTRACT OF MALT.

The Lancet says of the Kepler Extract of Malt: "The best known, and in this country the largest used Extract of Malt. It is as distinct an advance in therapeutics as was the introduction of cod-liver oil. It is one of our best remedies for atonic dyspepsia, and is undoubtedly useful in consumption and other wasting diseases." And further adds, "It is very good, and may be used with confidence."

For wasting diseases.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

McK. & R. CAPSULED PILLS.

An important improvement has been made, which now renders the most offensive and repulsive drugs easy of administration. This improvement consists in perfectly sealing with a thin transparent capsule of gelatine all drugs such as quinine, morphia, rhubarb, &c., also the various pills and powders of the Pharmacopœia. These capsules are of an ovoid shape, and it has been demonstrated beyond question that when ordinary coated pills are rejected by patients there is not the slightest difficulty in administering this new form.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

THE WYETH COMPRESSED TABLETS

EXACT SIZE OF TABLET.

"Are a great improvement on the hard, unpalatable lozenges which have so long done duty in the Pharmacopœia. The Chlorate of Potash and Chlorate of Potash and Borax will be found useful in throat affections, whilst the Bicarbonate of Potash and Bicarbonate of Soda Tablets will prove efficacious in dyspepsia. The Soda Mint, or Neutralising Tablets, will earn the gratitude of many a flatulent dyspeptic."—*The Lancet.*

For full Notes and Reports see front pages of *The Lancet*, May 6th.

HAZELINE.

The Medical Press and Circular reports:—"Hazeline is a valuable astringent remedy, wonderfully efficacious in checking *internal* or *external hæmorrhages*, and for *allaying inflammation*. It is particularly valuable in the treatment of *bleeding piles*, and as a *surgical dressing* it deserves attention."

For full Notes and Reports see front pages of *The Lancet*, May 6th.

THE ENTERPRISE DRUG MILL.

Constructed upon an improved principle, the cutters being easily removable for inspection or cleaning. It may be regulated to grind to any degree of fineness or coarseness, by simply turning a single thumbscrew. Is adapted to almost any dry pulverizable substance; it works rapidly and is economical.

Professor Maisch, one of the highest American authorities on pharmacy, says that "It is the best drug mill that has yet been devised. It is intended to displace the use of the mortar for general purposes in pulverizing drugs."

Prices { Plain .. .. 40s., 60s., 100s. / Ornamented 50s., 70s., 110s. } each.

NEW GOODS.

Special Notice to the Trade.

We beg to notify that the proprietors of Lundborg's Perfumes have appointed us their Sole European Agents.

The LUNDBORG'S PERFUMES have gained such popular favour in other countries, that we anticipate for them an equal appreciation in the United Kingdom by people of refinement and good taste.

OTHER ODOURS—

MARÉCHAL NIEL ROSE	2 oz. Bots., 33s. per doz.
TALLY HO!	1 oz. Bots., 21s. per doz.
FASCINATION	1 oz. Bots., 21s. per doz.

2 oz. Bots., 33/- per doz.

In America these goods occupy pre-eminently the first rank for quality above any foreign perfumes.

For Delicacy, Richness, and Permanency, Lundborg's Extracts certainly have no equal.

The rare excellence of quality, combined with the elegant and tasteful style in which they are put up, renders them at once attractive and readily saleable.

As novelties in this market, the trade will, we believe, be glad to introduce them, as they yield a good profit, and do credit to the introducer.

Reduction in Price of Murray & Lanman's FLORIDA WATER.

Retail, 3s. per Bottle. Price to the Trade, 26s. per doz.

Special prices in quantity or in bond.

Burroughs, Wellcome & Co., Manufacturing Chemists, 7, Snow Hill, London, E.C.

London: Printed by William Inglis Richardson, 4 & 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill, 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 641.] SATURDAY, OCTOBER 7, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,
17, BLOOMSBURY SQUARE, LONDON.
ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 1st, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 25th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of
Half-a-crown are entitled at each election of Annuitants to .. .. ONE Vote.
Five Shillings .. .. TWO Votes.
Half-a-guinea .. .. FIVE Votes
One Guinea .. .. TEN Votes.
And to increase in the same proportion.
Five Guineas are entitled to .. .. FIVE Votes for life.
Ten Guineas .. .. TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

LIBRARY AND MUSEUM.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

NOTE.

Members, Associates, and Apprentices residing in the Provinces, may obtain books from the LIBRARY on application to the Librarian and payment of carriage one way.

READING COVERS FOR JOURNAL.

COVERS with strings to hold 26 numbers of the Journal may be obtained of the Publishers, Messrs. CHURCHILL, 11, New Burlington Street, W., price 2s. each.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

The Session commenced on Monday, October 2nd, 1882, *as follows:—*

CHEMISTRY AND PHARMACY. .....Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY .....Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Commenced on Monday, October 2nd, 1882. They will comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
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Commenced on Friday, October 6th, 1882. They will comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

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INSTRUCTION IN
PRACTICAL CHEMISTRY,

Conducted in the Laboratory by the Professor and Demonstrator, commenced on Monday, October 2nd, 1882. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

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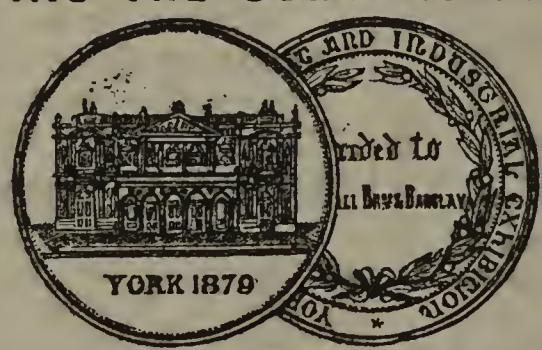

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May be prescribed with most substances compatible with Acids. In 4 oz., 8 oz., and 16 oz. Bottles and in Bulk.

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CAUTION—Purchasers must insist on having the Liebig COMPANY'S Extract. For flavour and clearness pronounced by all competent authorities to be the best.

Invaluable in cases of debility and weak digestion.

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SPECIAL NOTICE & CAUTION

BRAND & CO.

The original Manufacturers of Essence of Beef (green label under wrapper), and other Specialities for Invalids, have

NOT REMOVED

From their SOLE ADDRESS, No. 11, Little Stanhope Street, Mayfair, W., and caution the trade to

BEWARE OF IMITATIONS.

DR. J. COLLIS BROWNE'S
CHLORODYNE
THE ORIGINAL AND ONLY GENUINE.

IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & Co., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

DEAR SIR,—Have the goodness to furnish us with your best quotations for Dr. J. COLLIS BROWNE'S Chlorodyne, as, being large buyers, we would much prefer doing business with you direct than through the wholesale houses. We embrace this opportunity of congratulating you upon the wide-spread reputation this justly-esteemed medicine has earned for itself, not only in Hindostan, but all over the East. As a remedy of general utility we much question whether a better is imported into the country, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances, *ad infinitum*, of the extraordinary efficacy of Dr. COLLIS BROWNE'S Chlorodyne in Diarrhœa and Dysentery, Spasms, Cramp, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than COLLIS BROWNE'S, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than COLLIS BROWNE'S is a deliberate breach of faith on the part of the chemist, to prescriber and patient alike.

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SYMES & CO.,
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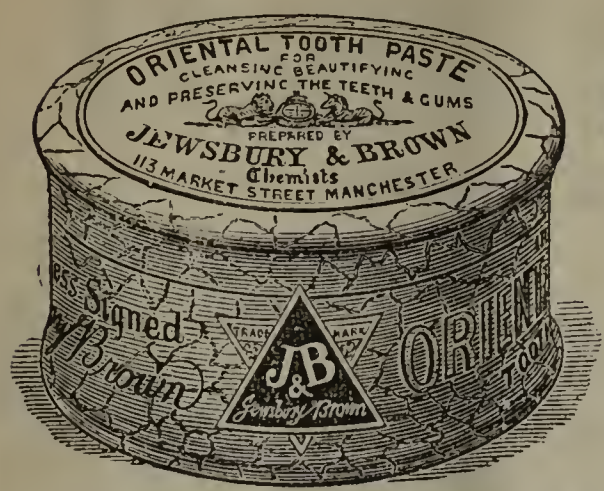

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20 ,,	9 ,,	17/6	20/	21/	23/	,,
32 ounce	10½ inches	20/	22/	22/	26/6	per dozen.
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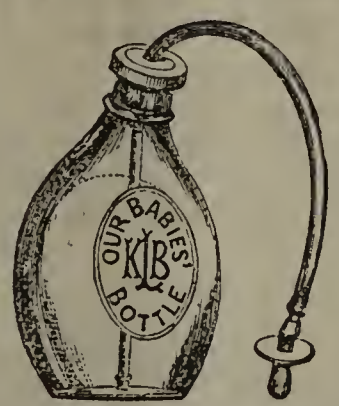

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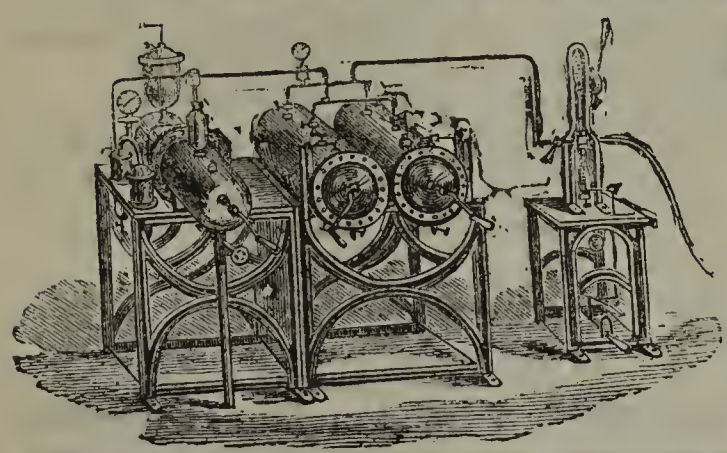

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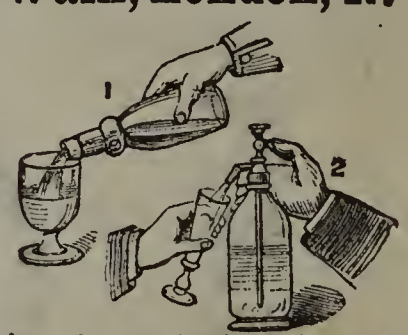

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INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE COMMENCEMENT OF THE FORTY-FIRST SESSION OF THE SCHOOL OF PHARMACY, *October* 4, 1882.

By JOSEPH INCE, F.L.S., F.C.S., etc.

Fifteen years ago the Annual Sessional Address to the students of the School of Pharmacy was inaugurated. The Council by whom the arrangement was made, and by whose immediate sanction it was carried out, met under the happiest circumstances.

It was not too late in the history of pharmacy to see gathered round the table as our representatives, men whose names have become household words, and whose memories will be for ever held in honour; nor was it too soon to recognize at the board, men of of a younger generation whose presence there was the best proof of the success of our educational system. Mr. George Webb Sandford was the President; and in view of actual and impending legislation he was chosen yet another year as Dictator; Mr. Daniel Bell Hanbury had just retired not without bequeathing to the Society a distinguished son, whose manner of work and conduct raised the dignity of our calling; there was Mr. Henry Deane of Clapham who taught by precept, and by example, that the one thing to be ashamed of doing, was a dishonourable action; the watchful intelligence of Mr. John Mackay removed all fear that the interests of Scotland might possibly be neglected; and specially is a speaker standing within these walls, bound to mention the name of Mr. Thomas Morson, to whose personal devotion so much of the prosperity of our Society is due.

Many of these foremost promoters of the cause of British Pharmacy have passed away, but of those who were on the Council during the historical year of the Act of 1868, two still remain; Mr. Peter Squire who last year renewed his youth, and held his own, at the deliberations of the London International Congress; and Mr. Thomas Hyde Hills who has contracted a habit of liberality from which he seems by no means anxious to be set free.

As regards the select band of councillors who were less advanced in years, they are now of age, and consequently can speak for themselves: if they had not as much experience, they had more of the spirit of the initiative than their seniors, and to them in the first place must be attributed the proposal which issued in the establishment of these pleasant anniversary rejoicings, the latest of which takes place to-night. The then President of the Council gracefully waived his indisputable right to address the students of that school of which he was the official head; and our elders did not feel themselves compromised by acceding to a project which though dictated by a generous impulse, was an innovation.

The time had long since passed when Pharmaceutical Education was in its infancy: the assistant who knew something of the contents of a book was no longer an object of suspicion to his master, or a source of anxiety to his friends: the teaching of the school was beginning to be a felt influence, and the idea was spreading amongst the most practical of business men that the best way to ensure the welfare of their children was to let them have a sound knowledge of those principles on which much of their trade, and the whole of its developments depended.

A fair number of students had exchanged the laboratory and the class-room for the activities of daily life; and, carrying with them the prestige of rewarded scholarship into new circles, became the centres of fresh educational endeavour.

It was thought therefore, and the assumption was not unreasonable, that a period had been reached when a more formal recognition of the re-opening of a session would be acceptable, and that no time could be more appropriate, than when legislation was about to change the framework of British Pharmacy. He would however be an incorrect chronicler of events who gave this as the sole motive for the creation of a sessional address.

Frequent representations had been made that London not only had the lion's share of executive administration, but the chief talk at the evening meetings, and generally floated at the surface of affairs. The country was left comparatively in the shade, and its interests were said to suffer in consequence.

Certain councillors held the opinion that geographical hindrances were not solely to blame for this inequality, and that if good men and true were invited from the provinces to address a London audience on some state occasion, it would be an excellent arrangement. At least one signal opportunity would be afforded for the country to be honourably represented.

So originated this ceremonial, and never shall I forget the eventful evening of October 7th, 1868. Would the thing prove a failure? It was to be a gala night: successful candidates were to receive their prizes: fathers and mothers were to rejoice over their sons' success: ladies were no longer to be excluded ftom the circle, but by sharing were to increase immeasurably the students' happiness. But would the fair sex fail to come and thus precipitate a collapse? or, would the lecture fall upon irresponsive ears? Everything went off brightly as sunshine, and the lecturer was quite himself—no higher praise can be imagined.

With occasional exceptions from that time forth, the address has fulfilled its double purpose. Mr. Brady led the way, and was followed by Mr. Deane of Clapham. To him succeeded a master of polite literature, Mr. Schacht, and next the regretted Mr. John Mackay. Then rose the western circuit to the occasion, bent on showing that its romantic neighbourhood was not to be confused with Nazareth:

many good things, particularly pharmacists, reached us from there, and the students listened with pleasure to Mr. Stoddart of Bristol; Mr. Giles of Clifton, and Mr. Ekin of Bath.

This would have been too much, had not a London man, Mr. George Webb Sandford, intervened in 1873 and equalized the pressure.

He was chosen because it was the unanimous opinion of his fellows that he could never be out of place.

Later on the list came Mr. Barnard Proctor, with his quaint originality and characteristic thought.

Mr. Southall passed in review the discoveries of modern science; while the reputation of Norwich was sustained by Mr. Corder.

The lot now fell, as it was fitting, upon two former distinguished students, Dr. Tilden and Dr. Langdon Down, and the discourse of Dr. Symes of Liverpool is still within your recollection.

I feel it no small honour to have been asked to follow men like these; and I thank those who hold the direction of our affairs, that I am permitted to say words of encouragement and advice to some who have gained distinction in this, the parent School of Pharmacy; and to such others as may desire to emulate their example.

In the name of the President and Council before whom I stand; in that of the Professors who will guide your studies, and in my own, we bid you hearty welcome.

You have come to London, that true metro-polis, the central city round which so many smaller towns have gathered, and by which they have been absorbed.

What will you do with your life here? You have been wise in coming, for supreme advantages are in the gift of this great place. While we rejoice that these are more and more decentralized, and that in different parts of the country facilities for improvement have been created, London presents them in such infinite variety as still to remain the wished-for haven of the student. Then, contact with this mass of people, with its innumerable interests, aspirations, and necessities, and the provision made for their promotion, is in itself an education. Men under such influences learn to estimate themselves aright; to make large allowances for others, and to drop the pettiness of spirit almost inseparable from a contracted sphere.

But we must not lose ourselves in generalities, and there is distinctly before my mind that to-night my business is with young men who have accepted Pharmacy as a vocation. Some have finished their first campaign and have been openly rewarded by the chief. Let me as myself an old student, congratulate them on their success. Let them take the good the Gods provide, without reserve or afterthought; and let the remembrance of past triumphs nerve them for fresh victories. Others are entering on the contest, overshadowed by the fond wishes of their relatives, and the earnest hopes in their behalf of every true-hearted pharmacist.

London has its splendid openings, but also its fell temptations—these have made or marred countless generations. What will you do with your life here? is a question we are bound to ask. Will you trim the lamp of science and keep it brightly burning; or will you kindle the unhallowed fire of passion, and run riot in its lurid light? One thing hold fast in your memory, and treasure it in your heart of hearts, that the time must come sooner or later when each one of us knows either in the joy of his soul, or in the bitterness of his disappointment, conduct is fate.

Fifty years ago Pharmacy as a corporate body had no existence. Here and there was an isolated light shining: such was William Allen in the hermitage of Plough Court; John Savory in the West End; midway between both, Thomas Morson; and my own father dwelling under the shadow of the Phenix; and there were a very great number of respectable individuals who honestly kept shop and aspired to nothing more.

A common danger drove the scattered ranks together, as a storm sends the most disunited to seek a common shelter. But no sooner was there a Society of some sort, a distinct and recognized community, than it was found imperative to have a stronger bond of union than mere aggregation of numbers. The grains of sand upon the seashore are numerous and form a distinctive class, but there is no cohesion among the particles; and from the first it was seen that numerical strength alone was destitute of vital power. Moreover provision had to be made for future exigencies, and it was vain for pharmacists to claim respect from the world outside, unless it were discovered that the claimants were men of trained intelligence and education. Hence necessity completed what threatened danger had begun: and so rose the School of the Pharmaceutical Society of Great Britain.

I have diligently searched the records of the period but I can discover no other English sources of instruction open at that date to the chemist and druggist, than the courses at our London and Provincial Hospitals in which Materia Medica, Botany, and Chemistry formed part of the curriculum. I learn from credible witnesses that none of these three branches were held in high estimation, but that they were subservient to purely medical studies, and tinctured with professional reference and allusion. The one subject that promised usefulness was that of Therapeutics which was not treated so as to be understood by the non-medical student. Pharmacy as a separate science had not risen into sufficient importance to have a teaching of its own or to rank as a distinct study, and I have listened to sorrowful details from druggists then engaged in business of the hopelessness of educational improvement.

At this crisis there appeared one who revolutionized the manner in which the once dry details of Materia Medica were elucidated: this was Jonathan Pereira. Endowed with a handsome person and commanding presence; having the gift of speech and a singularly buoyant temperament: clear in statement, and brilliant in illustration; he inspired his audience with enthusiasm for a theme which its nature hardly seemed to warrant. The dry bones lived—and from that moment an era in pharmaceutical education was begun. The genius of Mr. Jacob Bell saw at a glance that he had hit upon the right man with whose aid he should develop a new order of instruction.

Nearly as fortunate was the choice of Anthony Todd Thomson who was called to fill the chair of Botany. It would be difficult to find one who showed more unwearied diligence in a professional career. I have often been astonished whilst reading the acccount of his laborious activities; and it was no slight compliment that when our Society was in its infancy it should have been so effectually countenanced by men of a higher faculty, supposed sometimes, but erroneously to be antagonistic to the pharmacist. We had just acquired the right to be respected; a right which was immediately conceded.

Next in order came a young man, of keen susceptibilities and retiring habit; who wrote a successful essay for which he was publicly rewarded, and who had already begun to teach Chemistry not so much from books as by direct experiment and laboratory demonstration. This was George Fownes whose services it was no small gain to have enlisted. Lastly appeared upon the scene our own Professor, Dr. Redwood, of whom an old pupil can say nothing in his immediate presence. These were the pioneer exponents of the theory that education must be the lever by which to raise the druggist; to give him the command of circumstances, and to enable him worthily to fill the station which the framework of wise regulations and law might secure. So rose this School; and it was a bright day for British Pharmacy, and for the British public; for from that hour the reign of intelligence dethroned the rule of thumb.

Such amongst you as are the heirs of modern progress, are hereby informed that the word "rose" is metaphorical. Pharmacy like the bird of song had its nest upon the ground, from which like that bird it has risen skywards.

We were literally a foundation school, situated in the basement, which less euphoniously might have been termed the kitchen. From these subterranean regions evil smells ascended which discomfited the Council; and not unfrequently the students underground would receive visits from the powers above who expressed their sentiments in language which was not always guarded. A liberal bequest allowed more convenient arrangements to be provided; and it is clear that the conditions under which laboratory work was undertaken, were justified only by necessity. Sooner or later a change must have been made, for with increasing numbers those conditions had becoming impossible.

I believe that it is entirely due to the Professor whose praises have been left unsaid, that the school was shifted bodily to the topmost story, and was reconstructed according to the plans and with the appliances now open to your inspection.

As time presses, this brief historical sketch must end, and I propose with your permission, to say a few words to a beginner about the manner in which he may best pursue his studies.

Probably there is no time when encouragement, and even advice is less essential than at the commencement of a career of study. All is new, and novelty is a strong stimulant. There are fresh faces pursuits and associations; there is actual contact with persons whose names have been long familiar; and with places that have been known intimately by report. The dreams of imagination have become realities, and now they are clothed with visible shape and presence.

For a brief space there is no outward difference between one student and another: all alike are eager, confident and industrious. The tares are not distinguishable from the wheat.

But novelty must cease, and with it the influence of excitement, good in itself but evanescent. Here is the rock on which many a brave ship has foundered. When the sun shines it is easy sailing; and when the storm blows, every man is on the alert; but the calm is a perilous condition, for where there is little apparent progress, the most persevering are tempted to grow weary of well-doing.

This is doubly the student's danger,—his surroundings are no longer strange and no sooner has the stimulus of acquiring leading facts diminished, than a sense of lassitude springs up: the calm, most of all things to be dreaded, has set in.

At this critical point begins the differentiation between the good and the bad student. The first is sorely tried; but the second yields—unconsciously; to a great degree, imperceptibly; until a fatal carelessness becomes habit: until regret merges into apathy: until apathy itself runs through the transformations of inattention, recklessness and despair.

No man is suddenly a bad student—the phases of a downward path are generally as just described.

He who would win the race and wear the crown is warned that this period of stagnation will supervene. The better the student, the more quickly will it arrive; but it is the fourth month which frequently decides success or failure.

The student in chemistry knows his gases, acids, salts, metallic and non-metallic bodies, and theories of combination. In Pharmacy he knows the run of the preparations of the British Pharmacopœia; in Botany, the book-teaching of the subject, and he can both recognize and is acquainted with the history of the various products of Materia Medica. Then, either seeing the immensity of the field before him;

or far worse, not seeing it, and beginning to be content, the warmth of his ardour cools, and the fresh vigour of his energy decays. Would that he would allow an old student to be taken into his confidence, and listen while he tells him, that this state of passivity has afflicted countless generations of men who have triumphed over the narcotic influence; who have aroused themselves from a slumber fatal as the snow-sleep; and who have attained to what theologians call, final perseverance. Happy is the student, who feeling no pleasure in his work; with loss of appetite for study, and for a season indifferent to success; realizes that this is an illness of the mind produced by natural causes; and who quietly goes on his accustomed way certain that the fit will pass.

Poor humanity is not always in a crisis, nor exposed to overstrained emotion; three quarters of the student's work is of an equable and regular description. On an average it is all the better, should he be fortunate enough not to read alone. Two congenial friends having sympathies in common, and passing through the same curriculum, form a splendid mutual aid society. One cheers the other, and chaffs him pleasantly when inclined to loiter. Two, can talk over their mutual difficulties and question each other on the various subjects: two can examine each other's notes and point out deficiencies in the manuscript of either: two, to make the matter brief, are stated on high authority to be better far than one.

But should circumstances render this impossible, the best substitute is to read aloud, and unless this plan be adopted, a very large portion of the knowledge to be gained from books will escape the reader. Understandest thou what thou readest? is an ancient question; but the student who reads always to himself is not in a position to discover whether he understands or not. Forgive me if I insist upon this point. In cases innumerable an abstruse sentence becomes intelligible solely by this method; and it is the daily experience of every constant reader that words travelling through the air and coming back upon him as a listener acquire a meaning and a distinctness which previously they did not possess.

May I to-night repeat what I have insisted on for more than twenty years, that the regular consecration of a fixed portion of time, to any branch of learning, pharmaceutical or otherwise, will surmount whatever difficulties may be presented. Thus the enforced, consecutive and continuous devotion of one hour a day to a given purpose, is omnipotent. I know full well that the idea has been deemed romantic, but it never will be by those who venture on the attempt.

We read of genius—and in truth there is a species of divine intuition vouchsafed to a few. A street boy takes a piece of chalk and with it traces lines which command the admiration of the world; a rude miner in the bowels of the earth solves problems in mathematics; and an untaught lad makes music out of pots and pans—music destined to be the delight of after ages. For this there is no law—but next to genius there is something which marvellously simulates its effects, and that is uninterrupted perseverance. So great is its power that some have even mistaken its identity and declared that genius itself was but the faculty of unremitted application. Let us not quarrel about definitions—try it under whatever name; and should you inadvertently turn out a genius, your friends will be quite pleased.

The wise king said that of making books there was no end, and in the days of Solomon there were no second editions. There are now more books than ever, but it must be granted that many of them are extremely good. No man need hunt for an admirable treatise on any technical subject; and it is specially characteristic of the age that professors of acknowledged excellence devote their full powers to the literary explanation of their own science. Their works are correct, lucid and arranged with charming simplicity. They are no longer written to display the profundity of personal erudition, but lovingly, as if to beg the student to understand the contents of the manual.

He acts wisely therefore who is not a man of one book, but who is catholic in his selection, and who consults two or more standard authorities in each department of information.

But whatever text-books be adopted, they should not be blindly followed, or be permitted to supplant original thought. An author himself is the first to condemn such *literatim* study, for his wish is to instruct others in the lore which he has himself acquired, and to lead those who accept his services, into fresh fields and pastures new.

I am bound most unwillingly to advert to a peculiar cause of weakness which should not be suffered to continue. It has been to myself and others a matter of astonishment that there should exist in young Pharmacy such a dread of examinations. I am not alluding to those prescribed by law, for I have rigidly set myself the task of speaking only of the School of Pharmacy as such. I have designedly left untouched the broader questions of education, such as the proposed curriculum; the creation of recognized official centres, and the politics of our Society. We turn to the pages of the Journal and see that at the end of a session one student enters into competition (if the term can then be permissible,) for a prize: or two present themselves for an examination. Reports of former years confirm the statement that often the number of candidates is in inverse proportion to the number of the class. Some possibly argue that the reward is likely to pass into other hands, and it is therefore useless for them to compete, a notion which is confusion worse confounded as to the whole bearing of the subject.

If the value of the teaching here is represented by the medals, prizes and certificates which can only fall into the hands of a restricted few, the sooner the place shuts its doors the better. The expenditure, and the machinery employed would both be infinitely out of keeping with results. The system of giving prizes is the best at our disposal, and it contemplates two objects;—first, it directly promotes the activity of study, and is a public sign on the part of the authorities that certain students have distinguished themselves in a more than ordinary manner. Secondly, it is an inducement to persuade young men to accustom themselves to an examination, and thus to ascertain for themselves from time to time the exact position in which they stand. They will find no plan more useful, or more satisfactory: and, just as a merchant undergoes a perpetual examination of his affairs by consulting his accounts, and thus sees where he is weak, and where he is strong: where the source of failure by

being anticipated may be prevented; and also sees the exact moment when he may stand before the world with confidence; so the student may both ascertain his deficiencies, and know when calmly to rely upon his strength.

I implore the students of the opening session to be guided in these matters by common sense; and I ask them to court every chance of class examination—a process salutary beyond description, and one which will rob the official compulsory examinations of all their terrors.

Having reached this pleasant elevation let me not close my note-book without showing you a little sketch which I have made of a flower by the wayside: it is hardy in character; indigenous to Great Britain, and should be carefully cultivated by every student: the flower is called, Cheerfulness. You may think it a minor virtue, and an anti-climax to other gifts, but it is wonderful what it will do for a man as a mental, physical and moral safeguard. A cheerful heart doeth good as a medicine and puts its possessor in full pleasurable exercise of all his faculties. Cheerfulness will dissipate a thousand grievances real and supposed; it will smooth the rough angles of many an awkward corner, and it will open a myriad avenues of contentment.

It is so invaluable to the student: so tinges and changes the current of his life: makes him such a fine companion, and centre of happiness to others, that I cannot omit the gift from the catalogue of things essential.

And I knew once upon a time a master spirit of the art of cheerfulness, dear to Michael Carteighe, and to an examiner from Newcastle-upon-Tyne—in the person of John Cargill Brough.

It would be treason to long friendship not to bear one in loving memory this evening, who took so deep an interest in the establishment of these inaugural addresses.

There was within him a never-ending spring of pleasantry which rippled and bubbled over his correspondence, his conversation, and his life. His cheerfulness was contagious and found expression in quaint fancies and exquisite turns of thought. I am thankful to have been under such an influence, and many amongst us can make the same confession.

In his companionship our President would sometimes forget his bye-laws; and even the strictest of the sect of the students resident at Plough Court, remarked, "I like to hear Jack talk."

These are some hints which may aid you in turning to the best account your London life. I would have you bear in mind that you can make or mar the reputation of this historic School. From its walls have gone forth men whose success while here has added lustre to the place; and whose after-career has exalted British Pharmacy. Most of these continue to this hour to endow Pharmacy in a way which no Government, no grant of money, and no patronage, can do.

May I ask you to join their ranks and to hand down to your successors the fair fame which you have inherited. There is joy in harvest when the yellow sheaves are gathered; joy in the vintage when the grape is pressed; and there will be joy in many a near and distant household when you return laden with the spoils of successful learning. Well may the home be glad, when he who came to this great city as a trembling student, has finished his course bravely, and goes back—a man.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 7, 1882.

THE OPENING OF THE SESSION.

It will be admitted by all who have been privileged to attend an Evening Meeting of the Pharmaceutical Society in October that it constitutes one of the most pleasant of *réunions*. The students of the past session, with their hearty greetings of their former professors as well as of their successful fellow pupils; the new students, just buckling on the harness; the presence of ladies; the distribution of prizes; and last, but not least, the words of wise counsel which on such occasions are spoken by some one held in honour by pharmacists;—all conspire to create an enthusiasm which may be expected to produce good effects reaching far beyond the immediate occasion. We are glad to be able to report that the meeting on Wednesday last proved no exception to the general rule.

The reports of the Professors were, as they have been for many years past, eulogistic of the intelligence, application, and conduct of the students, and it was satisfactory to hear that, although the number of students in the School of Pharmacy had been rather smaller than usual, there were among them those who are likely to become men of mark in the future. Once more the silver medals of all three classes have been carried off by the same student, and the awards of the Professors have found confirmation in the decision of Dr. Clark and Mr. Gibson that this gentleman was also entitled to the Pereira Medal. In distributing the prizes the President spoke a few kindly words of encouragement to each recipient, and in handing the "blue riband of pharmacy" to Mr. Short, he appropriately reminded the audience that he also is a Pereira medallist.

Not the least successful event of the evening was the delivery of the Introductory Sessional Address by Mr. Joseph Ince. Mr. Ince's piquant literary style is now well known to pharmacists, and it may be fairly said that the address was most characteristic and one of his best efforts. A brief historic sketch of the origin and object of the "Annual Sessional Address," and an enumeration of the honoured names of those to whom in successive years the delivery of it has been confided, led up to a hearty welcome to the new students. Once more becoming historical he went back to the period, little more than forty years since, when pharmacy was not represented by a corporate body in this country, and recounted the steps by which the School of Pharmacy rose from the basement of the Society's premises to its present lofty quarters, interspersing here and there personal sketches of the early professors, and raising a frequent laugh by sly quips which gained in point by the dryness with which they were delivered.

Then turning to the real task of his address he cautioned students against giving way to the stagnation of the fourth month, advised them not to be men of one book, to cultivate companionship in their studies and gave them other advice which commanded the approval of all who heard it. When at the close of the address a vote of thanks was passed with acclamation it was felt that seldom had such a compliment been more richly deserved.

ELECTION OF BENEVOLENT FUND ANNUITANTS.

It is a subject for congratulation to learn from the official report that the Council at its meeting on Wednesday last, acting upon the recommendation of the Benevolent Fund Committee, decided that six annuitants shall be elected in December next. This will raise the amount disbursed annually in annuities to nearly £1400, a sum more than twice the income derived from funded property, which theoretically regulates the amount of responsibility incurred in this direction. It will be seen, therefore, that the Council relies upon the continued liberality of the subscribers and donors to the Fund, and it is hoped that a large proportion of those who have not yet renewed their subscriptions for the present year will be induced to do so at once by this action of the Council. That the relief afforded, great as it is, is unfortunately not yet commensurate with the distress existing, is evident from statements made by members of the Committee, as well as by the fact that for the six fresh annuities there are already nine approved candidates.

SUSPECTED LEAD POISONING.

The case of suspected poisoning by water contaminated with lead, reported in this week's Journal, has excited considerable interest in the neighbourhood where it occurred, and it is to be regretted that the circumstances connected with it have not been more clearly made known and less eclipsed by opinions tending to support opposing views. Thus as regards the cause to which the presence of lead in the water is ascribed, we only find it referred to incidentally, without any statement as to what mineral acid was present in the water in a free state. The account of the medical evidence given to disprove the alleged poisoning is equally unsatisfactory. It is difficult to understand on what grounds Dr. Tidy stated that though lead poisoning had preceded death it was not the actual cause of death in this case, but that the probable cause was granular disease of the kidneys, that being, however, as he admitted, a consequence of lead poisoning. We are not surprised to learn that the condition of the water in question is to be thoroughly investigated, for the doubts raised by this case are such as to make inquiry indispensable.

AUSTRIAN PHARMACEUTICAL SOCIETY.

The twenty-first General Meeting of the Austrian Pharmaceutical Society was held on the 17th of September, in the large building of the National Museum in Agram. The "Directorium" was represented by Messrs. Schiffner, Waldheim and Kwisda, from Vienna; the Pharmaceutical Gremium of Croatia by all the pharmaceutical chemists of Agram and some visitors and guests from Croatia, Slavonia, Istria, Styria, Moravia and Bosnia.

After the regular business affairs of the Society had been transacted, different motions proposed by the Directorium came on for discussion, the most important, brought forward by Mr. v. Waldheim, in reference to pharmaceutical education, was adopted unanimously. Mr. v. Waldheim also made a statement as to the progress made in carrying out the "International Pharmacopœia." It is only necessary to add to our recent note on this subject (before, p. 247), that the Italian representatives have now sent in their revised and amended lists to the President of the Commission.

For the guests and visitors of this meeting the Pharmaceutical Gremium of Agram and Croatia arranged a splendid banquet in the Hotel "Kaiser von Oestreich," which the Burgermeister (Lord Mayor) from Agram, Dr. Hofman, the President of the Police in Agram (Stadthauptman), the Landes Sanitals Referent, Dr. Rakovan, and Mr. Dezelic, Senator of the Municipium of Agram, honoured with their presence. The project to pay a visit to Banjaenka, in Bosnia, was not carried out, the weather not being favourable.

EARLY CLOSING.

A vigorous attempt is being made in different districts in the South of London to promote what is known as the Thursday half-holiday movement. A meeting has recently been held in the Masonic Hall, Camberwell New Road, under the presidency of Mr. W. Dodd, chemist and druggist, when a resolution was passed in favour of closing shops at five o'clock on Thursday afternoons. We hope that this movement may, as far as possible, receive the countenance of chemists and druggists, and would recommend those in the district of Camberwell desiring concerted action to communicate with Mr. Dodd, whose address is 169, Southampton Street.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the above Association will be held at 32a, George Street, Hanover Square, W., on Wednesday, October 11, at 9 p.m. precisely, when the President, Mr. W. A. Wrenn, will deliver his inaugural address. We understand that a complete and attractive programme is ready for circulation, and a most successful session is confidently anticipated.

EDINBURGH CHEMISTS' ASSISTANTS' ASSOCIATION.

The Edinburgh Chemists' Assistants' Association will commence a new session on Wednesday next, when an address will be delivered by the President, Mr. Peter Boa. We notice that in connection with this Association two prizes are offered to apprentice members for competition in the form of a written examination in Latin, English, Arithmetic, Elementary Chemistry and Pharmacy.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 4, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Hampson, W. Hills, Radley, Richardson, Robbins, Savage, Schacht, Symes, Williams, Woolley and Young.

The minutes of the previous meeting (August) were read and confirmed.

The PRESIDENT said the instructions given by the Council in August, with reference to the repairs and alterations, had been carried out, as far as practicable; but there were one or two alterations still incomplete, and he must ask for indulgence if the ventilation in some of the rooms was not yet as perfect as he hoped it would be.

ELECTIONS.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Loam, James Gilbert .....Reading.

Modified.

Hulbert, Samuel James .....Glastonbury.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Gaskin, John Henry .....Wolverhampton.
Gatward, Oswald .....Hitchin.
Jackson, William Moses.....Ayr.
Longtoft, William .....Bedale.
Ransom, Francis .....Hitchin.
Reade, John Edmonds.....Wolverhampton.
Weddle, William .....Gateshead.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bing, Charles .....Canterbury.
Cooper, George Thomas .....Market Bosworth.
Dyer, William Bury .....Halifax.
Evans, Robert .....Bala.
Gilbert, Joseph Anthony.....Manchester.
Greenhalgh, William Henry ...Rotherham.
Lamplough, James William ...London.
Notcutt, William Brighty .....London.
Oxen, David Hunter .....Tynemouth.
Powell, Samuel R. .....Scarborough.
Rees, Charles Joseph .....Swansea.
Rigden, George.....Folkestone.
Smith, Arthur Llewellyn .....Sidcup.
Topham, Thomas .....Mirfield.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who had made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Robert Coulson, 3, Vicar Terrace, Cranmer Road, Forest Gate, Essex.
Francis Charles Rawlings, Barmouth, Merionethshire.

APPOINTMENT OF SECRETARY TO THE NORTH BRITISH BRANCH.

Mr. Peter MacEwan was reappointed Secretary to the North British Branch until June next, it being considered desirable that in future the appointment of this officer should be made at the same time as that of the other officers of the Society.

Mr. RICHARDSON, having recently visited Scotland, had great pleasure in saying that he heard everywhere a most excellent account of the present Secretary, showing that he was thoroughly appreciated in Scotland.

Mr. BORLAND was very pleased to hear such an expression from a gentleman south of the Tweed. He might add on behalf of the Members of the Board of Examiners in Edinburgh, that they were thoroughly satisfied with the manner in which the work of the office was conducted.

ADDITIONS TO THE REGISTER.

The Registrar reported that the following:—

James Coley, 5, Chapel Terrace, Derby Road, Bootle, Liverpool,
Ebenezer Gibb, New Byth by Turriff, N.B., and
Henry Thompson, 105, Hither Green Lane, Lewisham,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register. In each case he had made inquiries and was satisfied that these persons were entitled to have their names put on the Register.

Mr. ROBBINS inquired if the chemists in the neighbourhood were satisfied also.

The SECRETARY said he could not say; he had adopted the usual course of writing to the medical gentlemen who had given the certificates.

Mr. SYMES said that as a matter of fact inquiries had been made of him, by the office, with regard to the gentlemen in the neighbourhood of Liverpool.

REPORTS OF COMMITTEES.

FINANCE.

The report and recommendations of this Committee were received and adopted, and several accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£20 to a member from 1853 to 1878, and also a subscriber to the Benevolent Fund. Applicant is now paralysed.

£20 to the widow of a former member and subscriber to the Fund.

£15 to the widow of a member and subscriber to the Fund. Applicant has had a former grant of the like amount.

£10 to a former member, aged 69.

£10 to a registered chemist and druggist, aged 72.

£5 to the widow of a former member.

One case had been postponed, and another application the Committee had declined to entertain.

The SECRETARY had presented the following statement for the current year:—

Income.

	£	s.	d.	£	s.	d.
Dividend on £18,600 . . .	556	10	0			
Subscriptions to end of September	1421	17	4	1978	7	4
Donations to end of September				377	11	0
				2355	18	4

On deposit . . . . . £500.

Expenditure.

	£	s.	d.	£	s.	d.
Annuitants:—						
22 at £35	770	0	0			
14 „ £30	420	0	0	1190	0	0
Casual grants up to October, inclusive				396	0	0
				1586	0	0

Thirty-six annuitants now on list:—

4 over 80.
14 „ 70 under 80.
14 „ 60 „ 70.
4 „ 50 „ 60.

The Committee recommended that certain names be placed on the list of approved candidates for annuities, and that six annuitants be elected on Friday, December 15.

The Secretary reported that three hundred and twenty four persons had not renewed their subscriptions during the present year.

The Council went into committee to consider the details of the report.

On resuming, it was moved that the report and recommendations of the Committee be received and adopted.

Mr. Bottle said it quite accorded with the views he had previously expressed that the Council would be perfectly safe in electing annuitants on the money coming from subscriptions, as well as on the interest of the invested capital. He found that prior to the election in 1872 only fourteen annuitants had been elected, thirteen of whom were alive at that time. The Benevolent Fund was not then in the condition in which it was now, for he did not know that in all his experience at that Council table he had heard anything more satisfactory than the statement now made. Up to the present moment there had been received something like £200 more in subscriptions than in the previous year, and on the previous evening the Committee had had an unexampled list of applicants for relief. He did not know that he ever remembered applications from people whom the Committee had felt so much desire to relieve,—persons who had been in good circumstances, and who, from causes beyond their own control, had come to poverty. He had much pleasure in supporting the election of six annuitants, believing that the subscriptions would come in amply sufficient to make the required payments.

Mr. Richardson desired it to go forth that continued efforts should be made to increase the Fund, so that more might be distributed in casual grants as well as in annuities. He had no doubt that if some energy were shown, not merely by members of the Council, but by influential chemists in every centre of Great Britain, the amount raised could be increased considerably. He feared that in future years there would be a painful accession of numbers in the applicants and of a character which all must much deplore. There had been several instances on the previous evening of persons who had lived in affluence, but who had been brought to poverty. As had been said, in nine months there had been an increase of subscriptions amounting to £210, and he believed if the year were taken it would be considerably more.

Mr. Hampson said he occasionally got letters from members of the Society objecting to the want of the spirit of adventure at the Council table in the distribution of the Fund. It had been said that there were two ideas as to the distribution, one being that only the interest on the money invested should be expended. But these correspondents objected to contribute to the Fund, because they felt that their money was not likely to be used in the way in which they wished. If they thought it would be spent almost to the utmost farthing it would give that kind of impetus that would compensate for any want of caution in the distribution. He thoroughly sympathized with that spirit and believed it only needed a statement that the Council was almost absolutely without funds in order to get an ample response. He was extremely gratified to find that new spirit had been infused into the administration of this Fund and he hoped next year it would evoke a hearty response throughout the trade, and lead to many more contributions being received. He felt sure there was plenty of money amongst chemists in the country, notwithstanding their poverty, to support all the poverty incident to the trade; it only required to be got at.

Mr. Robbins said it was very gratifying to see the present state of the Fund. He remembered when he first made the proposal that four candidates should be elected it aroused almost a consternation at the board, and it was said it could not possibly be done, because there was no money to pay for it. At that time the whole expenditure of the Benevolent Fund was something under £600, although there was an income of more than double that sum. The Council was then funding all that it could, but was only able to put by a small sum annually. Happily the Council was persuaded to add more annuitants, trusting to the benevolence of the general body, and from that time the funds had been increasing, whilst the sum expended annually had been doubled, trebled, and was now almost quadrupled. There were at that time thirteen annuitants on the books, and in a few weeks there would be forty-two, which was more than he, at that time, anticipated. He was also pleased to see the names selected as approved candidates, for he had never seen a a better list. Many of them were persons who had been members and had subscribed to the Society; who had held a good position and by some misfortune had been brought to seek help of this kind. He was quite sure it was a wise policy to spend the greater part of the money which was subscribed, and he hoped, before long, to see fifty annuitants on the list.

The Vice-President said he believed the necessity for the Fund was not likely to decrease but to increase, but he also believed in the statement made by Mr. Hampson, that the money was somewhere if it could only be got at. It appeared to him some sort of organization was wanted for getting at this money, some better devised system of collecting. The extra support that had recently been given was simply the result of extra efforts which had been made in various parts of the country, but he did not think that London had yet grappled with the problem. There was a huge population of four millions in the Metropolis, amongst whom there must be a large number of chemists who did not contribute, and it seemed to him that what was needed was a method of organization for going round and asking for contributions, and in that way he believed that a large revenue could be obtained. It was very seldom that charitable contributions were sent; they were always called for. He should be very glad if the Council would put its shoulder to the wheel and take up this matter.

Mr. Symes had no wish to damp the spirit of satisfaction which seemed to pervade the Council in regard to the state of the Funds, but he should like to call attention to the fact that, although the Committee was then in the proud position of proposing to elect six candidates, there were nine down on the list, all of whom were eligible, and he should like it to be recorded that not-

withstanding the special efforts made this year, still three hundred and twenty-four persons had not subscribed this year who did last. Putting those facts together, it showed that whatever satisfaction might be felt there was still room for considerable accession to the Fund, and still a large number of cases which could not receive the amount of aid the Council would like to give.

Mr. WILLIAMS said he had just glanced through the books and he was quite certain that of the three hundred and twenty-four persons who had been mentioned as not having yet paid the subscriptions for this year, a large number only required to be reminded of it; he was sure a great deal of that money was not lost to the Fund.

Mr. BOTTLE could not allow the discussion to close without expressing his dissent from the view which the Vice-President seemed to entertain, that London had not been properly attacked, if by that it was intended that London did not subscribe as it ought to do. He found that out of fifty columns of names of subscribers to the fund for the whole Great Britain nine were filled by London, which was, he thought, a very fair proportion.

Mr. SAVAGE asked if any efforts were made to remind those who had not paid the subscriptions that were due.

The SECRETARY said that two written applications had been sent and another would be.

Mr. SAVAGE suggested that if someone in a locality, well acquainted with the subscribers, would call it would be more likely to be efficacious. If there were any in his neighbourhood he should be happy to call upon them.

Mr. ANDREWS said he had said the same with regard to any gentleman in his district.

Mr. ROBBINS thought it would not be advisable to pester too much.

The SECRETARY said he did not think there were many subscriptions lost for want of their being asked for.

Mr. HAMPSON thought the residue of the London subscriptions might be gathered in if a list were furnished to a clerk for collection; it would be better than merely sending a circular.

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

Legacy from the late Mr. Howden.

The SECRETARY announced that since the last meeting of the Council, Mr. Robert Howden, of Gracechurch Street, who had been a subscriber and also donor to the Fund, had died. A communication had been received from one of the executors, saying that Mr. Howden had left a bequest of £100 free of legacy duty to the Benevolent Fund, which he should have the pleasure of forwarding as soon as probate was granted.

GENERAL PURPOSES.

The report of this Committee was, as usual, considered in committee. It included the usual letter from the Solicitor giving particulars of cases which had been placed in his hands. It stated that in the case of Sinton Michael Honan, 90, King Street, Hammersmith, the defendant had confessed judgment, and judgment had been entered for the penalty and costs.

Several other cases had been considered by the Committee, and in some cases it was recommended that the Solicitor be instructed to commence proceedings.

A memorial had been received from a person at Derby, praying that his name be restored to the register; but after going at length into all the circumstances of the case, the Committee had seen no reason for altering the decision arrived at in May, 1881.

The report and recommendations were received and adopted.

COMMUNICATION FROM THE PRIVY COUNCIL.

THE SOCIETY'S EXAMINATIONS.

The following communication from the Privy Council Office was received:—

"Council Office,
"16*th August*, 1882.

"Sir,—I am directed by the Lords of the Council to transmit to you, to be laid before the Pharmaceutical Society for their information, a copy of the report upon the examinations held by the London Board of Examiners of the Society in 1881, by Dr. Greenhow, the officer appointed by their Lordships to attend such examinations.

"I am, Sir,
"Your obedient Servant,
(Signed) "C. L. PEEL.

"The Secretary,
"The Pharmaceutical Society,
"17, Bloomsbury Square."

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the Year* 1881.

"During the year 1881, the London Board of Examiners of the Pharmaceutical Society held twenty-five meetings for the examination of candidates for registration under the Pharmacy Act, 1868. This is exclusive of the first or Preliminary examination, which continues to be conducted by the College of Preceptors.

"*Preliminary Examination.*—During the year 1881, 1187 candidates offered themselves for the Preliminary examination in English, Latin and arithmetic, 512 of whom passed and 675 were rejected, being at the rate of 56·8 per cent. The proportion of failures was, therefore, unusually large.

"Of the rejected candidates 20 who had obtained the minimum passing number of marks, viz., four-tenths of the allotted number, in each of the three subjects of examination, failed because they did not obtain half the aggregate number of marks on the whole examination; 86 failed in all the subjects; 77 in English; 53 in Latin; 195 in arithmetic; and 244 in two of the subjects.

"*Major Examination.*—Only 100 candidates presented themselves for the Major examination during last year, 51 of whom passed and were registered as pharmaceutical chemists, and 49, being at the rate of 49 per cent., were rejected. Of these 7 failed, although they had gained the minimum number of marks in each separate subject, because they did not obtain half the number of marks allotted to the whole examination; 32 failed in chemistry and practical work, and 10 in botany or in botany and either materia medica or chemistry.

"*Minor Examination.*—During last year 567 candidates for the Minor qualification were examined, 278 of whom passed and were registered as chemists and druggists, and 289, or in the proportion of 50·6 per cent., failed; of the latter, 51 failed in the whole examination, although they had gained the minimum passing number of marks in each separate subject; 81 failed in chemistry; 44 in materia medica; 13 in botany; 25 in reading Latin prescriptions; 18 in practical dispensing; 23 in pharmacy, and 34 in two of these subjects.

"*Modified Examination.*—Only 9 candidates came up for the Modified examination last year, 3 of whom passed, and 6 were found incompetent.

"I have, on former occasions, pointed out the probable causes of the very large number of rejected candidates at the pharmaceutical examinations. They are, as regards the first or Preliminary examination, the very inadequate early education of the large majority of the candidates; and, as regards the technical examinations, their very defective training during the three years passed in a chemist's shop previous to admission for the Minor examination.

"I learn that many of the candidates for this examination have had only scanty opportunities for practically learning to read prescriptions written in Latin, or to dispense and compound medicines; as a rule, it is only in large towns that there is much demand for dispensing physicians' prescriptions, and when a young man is

apprenticed to a master who has not much dispensing work, he can neither acquire the intimate acquaintance with the physical characters of drugs and chemicals, nor the practical skill in dispensing, which he requires to fit him for carrying on business on his own account, and which he is expected to manifest in the examination room.

"The large number of rejections at the examinations of the Pharmaceutical Society has naturally attracted much attention on the part of the Council of the Society. A Special Committee was accordingly appointed by that body in 1882 to inquire into and consider the relation to each other of pharmaceutical education and pharmaceutical examinations.

"A first report was presented to the Council in August, 1881, and being generally approved, was referred back to the Committee for the consideration of details.

"The final report was brought up in April of the present year and, with the exception of a clause recommending that the Minor examination should be divided into two parts, with an interval of not less than six months between the first and second portions, was adopted by the Council, and subsequently by the Annual Meeting of the Society.

"As, however, the recommendations contained in that report will still need some consideration before they are carried out, and further, as it is not proposed that they shall come into force until January, 1886, I defer offering any detailed comments upon them until further steps have been taken by the Council with a view to their practical adoption. I may, nevertheless, say that the two first recommendations are accordant with views I have expressed in previous reports.

"They are, first, that candidates for examination be required to produce evidence of having passed an apprenticeship or pupilage of not less than three years with some duly registered chemist and druggist; and, secondly, that the Preliminary examination or its equivalent be passed prior to apprenticeship or pupilage.

"In conclusion, I am glad to be able to express my opinion that the examinations of the Pharmaceutical Society held in London, as at present conducted, afford a sufficient guarantee that the candidates who pass them are competent to be registered under the Pharmacy Act, 1868.

"(Signed) E. H. Greenhow."

Mr. Hills said he considered the Preliminary examination one of the most important parts of the qualifying process, and he was disappointed to find the percentage of failures was on the increase. He had obtained from the office the percentages for the last five years. He found in 1877 there were 46·7; in 1878, 52·4; 1879, 46·88; in 1880, 48, and in this Report there were 56·87 failures. One point which especially struck him as very disappointing was that in such a subject as arithmetic about one in six failed to pass. He did not think the arithmetical questions were of such a nature as to cause this result, for in a chemist's daily business questions quite as difficult often occurred, so that one unable to pass in arithmetic would scarcely be fit to dispense prescriptions. He saw, moreover, that only half the full number of marks were required to pass, and it would be very interesting to know how many of those who did pass obtained 70 or 80 per cent., for after all those were the men to whom they should look for the future. It could not be too strongly insisted upon, that this Preliminary examination was very important, and it was very desirable that parents and guardians and those interested in the future of young men should make it a subject of thought, and see that those under their care came up in some way fitted for their future career.

Mr. Richardson quite agreed with Mr. Hills, and said the results now shown entirely bore out the arguments he had adduced before, that the young men, before being apprenticed, had not had a sufficient education; in fact he thought that the young men now coming forward were not of the same calibre as were those some time ago. It was all very well to say that parents should be told of this, but he was afraid that, in country places especially, chemists were induced to take young men as apprentices without having sufficient regard to the future requirements of their position, and it had been his duty frequently to advise parents and guardians on this point that the better plan would be to see that the candidate was tested as to his educational powers before being apprenticed. He hoped that as soon as possible that portion of the curriculum would become law.

Mr. Symes said the greater part of this Report was very properly a historical record of the facts connected with the examination, and it was only towards the conclusion that Dr. Greenhow drew any deductions. The paragraph which interested him most was the final one, which seemed to him to cut at the foundation of much of the work the Council had been doing. Whether Dr. Greenhow was under a misapprehension or not he did not know, but reading the Report a person not conversant with the discussions in the Council would say that an exceedingly good case was proved for this concluding remark. The Report showed that a large number had been examined, and that a large proportion was rejected, and if the examinations were sufficiently stringent to sift out a large proportion who presented themselves they accomplished all that could be desired at the present moment. If that were so the inference might also be drawn that the direction in which the Council was working was the making of examinations more stringent, or placing further difficulties in the way, and, therefore, it was a pity the paragraph should pass without some notice being taken of it. It could not be too frequently stated that the sole object of the Council was to increase the facilities for passing the examinations, and to reduce the percentage of failures. So that when future reports were presented it would be found that properly trained young men would come up so thoroughly prepared that, instead of there being 60 or 65 per cent. of failures, there would be only 10 or 20 per cent. That was really the object of the changes it was proposed to introduce. The deduction which appeared to be drawn was that if a young man passed the examination as at present conducted it was in itself a guarantee that he was a thoroughly qualified young man, but in certain cases it was thought some passed the examinations who were not thoroughly qualified.

Mr. Williams said the statement was that the candidates who passed were competent to be registered under the Pharmacy Act. He thought Mr. Symes was rather misreading the paragraph.

Mr. Symes said if that was the statement of a simple fact he could only say that what the Council was doing was something which was undesirable.

The Vice-President hardly thought that was so. He agreed with Mr. Symes that it was a matter of regret that there was such a large percentage of failures, and no doubt the action of the special Committee on the subject was to endeavour to reduce the percentage. But he differed with him on the interpretation of this last clause of the Report. It seemed to him that Dr. Greenhow, in representing the public interest, had simply stated what was important as an endorsement of their work—that he believed the examination was a true and honest one, and that the men who passed it were competent to go into pharmacy. To come back to the important matters raised by Mr. Hills, it could not be too much impressed on all young men's minds, that to succeed well in the future they must start well. This matter of the Preliminary examination, although it might seem to some but the smaller matter, because it was a scholastic examination and not a technical or scientific one, was of the highest importance. It was very desirable to start with an educated class of men, and he had always urged that the qualification should exist before the apprenticeship

commenced. He held the strongest convictions on that point, as he did ten years ago; but the awkward fact constantly came up that a very large number of young men entered the calling who were perfectly incompetent, from the want of an early education, to pass the examination. In fact children who were successful in the sixth standard under the Elementary Education Act were far better prepared than a large number of young men who entered the trade. But having entered it a man naturally said, "What am I to do? I have been at it some time, and I cannot turn to anything else." Without raising the question of elevating the standard, it ought to be insisted that those who commenced work should come in with a good sound liberal education.

Mr. Robbins agreed with the views of several speakers that these rejections were not a small question. It was important in many respects, not only to the young men who were rejected and the Society, but to the public also. All young men who went into the trade should by proper perseverance be able to pass the examinations, but the great objection to the present state of things was that about half of the candidates were rejected after they had commenced to be pharmacists and had learnt something of the business, and then what could they do? He understood that a great number of them went to grocers and introduced the chemists' business into the grocery shop, and this it was which had caused so much mischief throughout the country. The great object of the Society should be to get young men to pass the Preliminary before learning any of the technicalities of the trade. If they were not up to the proper standard they would not enter the trade, but if they were they would be able afterwards to pass the subsequent examination if they only properly applied themselves.

Mr. Savage thought on the whole this was a very satisfactory Report. It was not only the Preliminary examination that had to be looked to, but the paragraph which related more particularly to the masters ought to be strongly impressed upon them. Dr. Greenhow said that he learnt that many of the candidates had had only scanty opportunities for practically learning to read prescriptions or to dispense and compound medicines, and that as a rule it was only in large towns there was much demand for dispensing physicians' prescriptions. These were really important matters which were not so much dependent on the Preliminary as they were on the masters themselves. He knew that many masters much neglected to impart that information which they themselves possessed to the young men under their care.

Mr. Hampson said the difficulty in this respect, which was no doubt very unfortunate, was almost insurmountable in the present condition of pharmacy. The majority of chemists in this country really did not get prescriptions to dipense; the dispensing was done by the medical practitioner, and that was the key to the whole question with respect to the pharmacy of the future. If pharmacists had the pharmacy of the country in their hands they would have no difficulty in training the young men, because during their apprenticeship they would be brought into contact with prescriptions and would have to dispense them and handle drugs, and in many cases would have to make preparations themselves, and thus pharmacy would be constantly progressing. But what was the prevailing state of affairs? Even in London, which was supposed to be the centre of the universe, dispensing was not done by chemists and druggists, and yet it was expected at the same time that young men would enter the profession with zeal and almost with acclamation; and that they would feel a deep interest in their own education. They did not do so, and the reason was quite palpable. They saw that the prescriptions did not come into the shop of the chemist, who was already qualified and established, and perhaps a member of the Society, and consequently there was little or no interest taken in pharmacy. In other countries there was no difficulty. In France, Germany, and even in democratic America, there was no difficulty about the educational question, because the prescriptions gravitated in the proper direction. They reached the chemist's shop, and the student of pharmacy was interested, because he was surrounded with pharmaceutical matter. Until that matter was settled and pharmacists had the dispensing of the country in their hands there would be always this difficulty with respect to education. When even the highest qualification of the Society was obtained, the student knew he had to begin business under most adverse circumstances; he had to establish a business or join another and to deal in all kinds of things to make a living. But unfortunately all this miscellaneous trade was gravitating away from him and there was nothing but bare pharmacy, which unfortunately scarcely existed at all, left to him to depend upon.

Mr. Schacht wished to express his gratification that this Report, to a great extent, coincided with the results arrived at by the Committee which had devoted a large portion of time and consideration to this subject. The Report itself and the tone of the discussion had gone to show the wisdom at any rate of the first two of the recommendations submitted to and adopted by the Council; so distinctly and deliberately was that done that, although he was pleased to hear the repetition of the same opinions, he hardly thought it was necessary. But he could not help thinking that Mr. Symes was to a great extent correct, when he said that if this last paragraph was absolutely true there was no occasion for a large portion of the labours through which the Committee had been going. That was how he understood him; not that he objected to the expression as a legal opinion, but that it did not contain what he should like to have seen Dr. Greenhow finish his Report with. He should endorse that view exactly, for, although it might be perfectly true that the Society only registered such persons as were legally qualified to be registered, and, in that sense come up the legal requirements, still he was bold to say that many of those who were placed on the list were not up to the standard of pharmaceutical requirements that he should like to see them arrive at; and what was more, he thought that the examiners felt that in the present condition of affairs, they were not themselves quite competent to gauge the qualifications of the candidates. It was for that reason the Council had come to a unanimous conclusion that, in addition to an examination test of a man's qualifications, there should be a curriculum established. All educationalists had pretty well come to the conclusion that an examination test was not in itself sufficient. No examination test, applied in the fashion in which the Society's examinations were applied, could possibly be a real test of the qualifications of the candidate, and, therefore, the Council had come to the conclusion that the examination must be supplemented by a curriculum, in order to secure the registration of only those who were competent to conduct a responsible occupation. The last part of the Report seemed to assume that the examination alone had been proved to be sufficient to guarantee all that was required; but all agreed that it was not, and that, in addition to a curriculum which should train a man to pass the examination, the examiner should be strengthened in declaring a candidate to be competent because he knew that he had been trained up to the examination by a certain course, and that he had carefully followed the course of instruction prescribed by the Council before he came up for the final test of the examination. He thought the Council was quite justified in expressing a regret that no allusion was made to this point by Dr. Greenhow.

Mr. Young said he came to the conclusion, reading this Report, that the last paragraph merely referred to the opinion entertained by Dr. Greenhow as to the high character of the gentlemen who conducted the examinations, and expressed his satisfaction as to the manner in which they were carried out. He quite agreed with

what had been said with reference to the importance of preparation for the Preliminary examination. Beyond that Dr. Greenhow referred to the defective training of the candidates during the three years passed in the chemist's shop, and so on, and further down where he reported as to what had been done by the Council, he adverted merely to the first two resolutions, omitting altogether any reference to the curriculum, as Mr. Schacht had pointed out. That appeared to be the one thing which was wanting in order to give some kind of indication as to what his views were, and so far he thought it was a defect, because without that it appeared to him the Council would be left much in the present condition of things. The candidate had merely to show that he had been apprenticed for three years, and unless the curriculum was brought to bear, matters might go on just as they did now.

Mr. Williams said he disagreed entirely with Mr. Schacht's remarks on one point, namely, that the Council had unanimously agreed on certain questions which had been brought before it on more than one occasion. On one occasion the Council was so far from being unanimous that it was the casting vote of the President which carried the proposition, and in other cases there was certainly a majority against the Committee's recommendations. Therefore he could not see, himself, that there was any right to assume unanimity on the part of the Council at present, until these matters had been further considered, for he denied that they had as yet been fully considered. There had been certain reports presented which the Council could not understand, and which were rejected on some occasions; on another occasion, the Council agreed to the principle. On the last occasion another report was agreed to, not unanimously, but simply under protest, it being referred to another Committee for further investigation.

The President said that the three resolutions referred to in the Report were passed unanimously on the motion of Mr. Williams.

Mr. Williams said the resolution was carried under such circumstances and conditions as made it very different from what was assumed. He thought Dr. Greenhow in this paper really gave the proper and right view of the matter.

Mr. Symes said he in no way complained of the Report, which he had no right to do. In fact, when he first read it he thought it was almost intended as a compliment. Mr. Schacht had thoroughly interpreted his meaning. What he wished to point out was, what the Council had already agreed to, that certain young men neglected their training and got posted up in examiners' questions rather than got educated, and then came there to pass the examinations. The fact broadly stated in the Report was that the man was qualified, whilst the Council by its action had said that many of these men, although legally qualified, were not properly qualified for the business they went into. That was the ground of the action of the Council. First, to reduce the number of failures, and secondly, to secure that all those who passed the examination were thoroughly qualified. The question of the curriculum was before the country and presented itself in different aspects to different people; in some cases no doubt it met with opposition, and he feared this Report might be used as an argument that no curriculum and no further restrictions were required. He should be sorry if such were the effect produced.

The President said that he thought this discussion might now terminate. This Report was a very important document, but he thought more weight had been attached to the last paragraph than the writer intended, and he feared some of his colleagues looked at it partially, as members of the Education Committee. Looking at it as an individual he saw nothing whatever to find fault with, and he believed he had as much interest in the subject referred to as anyone. He considered this was a strictly accurate report; there was not even a tacit disapproval of certain of the recommendations, which might be said to be more or less incomplete at present. With regard to the curriculum, the Council had not yet laid down the basis on which to act with regard to the recognition of schools; and with regard to the examination itself, it had not yet decided what form that should take. He was not sure that Dr. Greenhow, in reporting as he had, was not quite right in taking those two resolutions which were clear and decided, and making his comments on them, and leaving the other matter for further information and consideration. This Report was for the year 1881, and he took it to be distinctly encouraging to the views held by that Council. He believed the writer simply intended to mean what he said, that those who passed the examination were competent to be registered under the Act. Dr. Greenhow had had large experience in every department of the medical profession; he knew the wants of pharmacists extremely well, and simply required to have all the facts put before him and to consider his own experience in connection therewith before coming to a conclusion. He believed that when the proper time came Dr. Greenhow would be found to agree entirely with the views of the practical men who had been consulted on this subject.

Leeds Chemists' Association.

The Secretary reported the receipt of a letter of thanks from the Leeds Chemists' Association for copies of the Journal.

Pharmacy in Guernsey.

The President said Mr. Crossley, of Guernsey, an Associate of the Society, had written to inform the Council that an Act had been passed for one year placing the law in that island on a moderately satisfactory basis with regard to the sale of poisons and enclosing a copy of the following "Ordonnance" which had been passed:—

"*Ordonnance provisoire au Sujet du Débit de Poisons.*

"Vu les dispositions des lois du Royaume Uni à l'égard du débit de poisons attendu qu'il est expédient que des provisions analogues à ces dispositions soient introduites en cette Ile:—La Cour en amendant les provisions de l'Ordonnance provisoire à ce sujet passée aux Chefs-Plaids d'après Noël, tenus le 17 Janvier, 1881, ouïes les conclusions des officiers de la Reine, a ordonné et ordonne.

"I. Il est défendu à qui que ce soit autres que les pharmaciens et chimistes dûment autorisés à exercer leur profession dans cette Ile de débiter des poisons.

"Il est défendu aux dits pharmaciens et chimistes de débiter des poisons sans que la bouteille, boîte ou enveloppe contenant le poison débité ne soit marquée avec le nom du poison—le mot 'poison' en grandes lettres—et le nom et l'addresse du vendeur.

"III. Il leur est défendu de garder les poisons dont les noms sont insérés dans la première partie de la liste contenue dans l'article 6 de la présente Ordonnance à moins que les dits poisons ne soient déposés dans des armoires, boîtes ou autres lieux fermés à clef.

"IV. Il leur est aussi défendu de débiter les dits poisons insérés dans la première partie de la dite liste à des mineurs âgés d'au-dessous de quatorze ans ou à des personnes inconnues au vendeur.

"V. Ils sont tenus de garder un livre spécial dans la forme suivante:—Nom de l'acheteur; Nom et quantité de poison vendu; Pour quel objet; Signature de l'acheteur; Date.

"Et d'y insérer ou faire insérer le faits ci-dessus applicable à chaque vente de poisons dénommés dans la première partie de la dite liste.

"VI. Sont comprises sous le nom de poisons les substances suivantes leur désignation dans la langue Anglaise.

"Partie I.

"Arsenic and its preparations.

"Prussic acid and its preparations.

"KCy and all metallic cyanides and preparations.

"Strychnia and all poisonous vegetable alkaloids and their salts and preparations.
"Atropine and preparations.
"Aconite and preparations.
"Emetic tartar.
"Corrosive sublimate.
"Cantharides.
"Savin and its oil.
"Ergot of rye and its preparations.
"Chloral hydrate.
"Essential oil of almonds undeprived of prussic acid.
"Opium.
"Corrosive sublimate, sol. of.
"Corrosive sublimate, yellow potion of.
"Morphia acet., sol. of.
"Morphia hydrochlor., sol of.
"Morphia.

"Part II.

"Oxalic acid.
"Chloroform.
"Belladonna and preparations.
"Opium, the preparations of.
"Poppies, the preparations of.
"Red oxide of mercury (red precipitate of Hg).
"Ammoniated mercury (white precipitate of Hg).
"Every compound containing any of the poisons above mentioned, when prepared or sold for the destruction of vermin.
"The tincture and all vesicating liquid preparations of cantharides.
"VII. Toute personne, qui enfreindra un des articles ci-dessus sera passible d'une amende qui ne sera pas moins de £2 stg. et n'excédera pas £20 stg., la dite amende applicable moitié à Sa Majesté et moitié au délateur.
"VIII. Sera rappelée l'Ordonnance des Chefs-Plaids d'après Noël, tenus le 18 Janvier, 1730, au sujet de l'arsenic.
"IX. Et sera cette Ordonnance en force jusqu'aux Chefs-Plaids d'après Noël prochain."

Mr. Radley said he knew one case of a young man who had failed to pass the examination here who had gone to Guernsey to set up in business, and he believed that had not been an uncommon occurrence.

The Council then went into committee to consider a complaint with regard to the appointment of a deputy superintendent of written examinations in the country, and upon resuming adjourned.

EVENING MEETING.

Wednesday, October 4, 1882.

The first Evening Meeting of the Session was held on October 4, the chair being taken at 8·30 by the President, Mr. Michael Carteighe.

After a few words from the President, explanatory of the programme of the proceedings, Professor Redwood was called upon to give his—

Report on the Chemistry and Pharmacy Class.

Professor Redwood said his report was not less satisfactory than it had usually been on previous occasions. Although the attendance of students in the School might not have been so numerous as could be desired, there was distinct evidence of an improvement in that respect, and both he and his colleagues could give a very good account of the way in which the students had acquitted themselves during the last session, not only with regard to their general conduct, but to the proficiency in the prosecution of their studies, of which they had given evidence. Acting in accordance with the desire and intention of the Council, the Professors had endeavoured to make the system of education there the means of laying a solid foundation for the qualification of those who were about to engage in the practice of pharmacy. Their programme was, as it had been for years past, that which the Council, aided by the best advice and assistance it could obtain, had recently given its approval of, and even intimated its intention of making ultimately compulsory as a curriculum. They had no faith in and did not encourage in any way the lath-and-plaster system of giving a semblance of a qualification, which, although it might sometimes pass current at a review, nevertheless lacked that solidity which alone would give it permanence and enable those who had it to bear the brunt of what was required in a professional life. One of the most important and encouraging features of the last session of the School was that a large proportion of those who entered as students did so at once for the whole session, thus giving palpable evidence that they at least were not advocates of the lath-and-plaster system. It was only natural to expect that students of such a class would prove to be a good sort, and this expectation had not been disappointed. They had been regular and punctual in attendance, well conducted and assiduous in their attention during the lectures, and had, moreover, given evidence at the after lecture examinations, that they were carrying away and digesting that which had been supplied to them. The result had been that when they came to the final examinations for the distribution of prizes and certificates, it was found that a goodly number had acquitted themselves with very great credit, and he must briefly submit the names of those in his class whom he had recommended to the Council for distinction. The session was divided into two courses of five months each. At the end of the first course an examination took place, when he who had acquitted himself most creditably was awarded a bronze medal, whilst others who reached a certain standard received certificates of merit, it being necessary for the candidates to give answers equivalent to 75 per cent. of the total number possible in order to obtain these certificates. At the end of the second course, a sessional examination was held, when a silver medal and certificates of honour and of merit were awarded. Having mentioned in complimentary terms the names of the successful candidates, which will be found below, Professor Redwood concluded by expressing his entire conviction that all these gentlemen were fully entitled to the honours which were about to be conferred upon them.

The President then presented the prizes and certificates awarded to members of this class, as follows:—

Five Months' Courses.

First Course.

Bronze Medal ..... Fredk. Wm. Short.

Certificates of Merit ..... Thos. Goddard Nicholson. Richd. Augustus Cripps. Edward Marsh. Walter Clark Drew.

Second Course.

No award made.

Session. Ten Months.

Silver Medal ..... Fredk. Wm. Short.

Certificates of Honour ..... Walter Clark Drew. Edward Marsh.

Certificates of Merit ..... Richd. Augustus Cripps. Thos. Goddard Nicholson.

The following are the questions which were set for these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours—Eleven till Three.

1. Describe the forces of *cohesion* and *adhesion*, showing the difference in the meaning of these terms, and the essential characters of the forces to which the terms are applied. Give illustrations of the action of these forces.
2. Describe the physical condition of gases as distinguished from liquids and solids, and explain the meaning of the term "critical condition" in relation to gases.
3. Give examples of good and of bad conductors, radiators, absorbers, and reflectors, of heat.
4. Describe the hydraulic press, the principle of its action, its advantages, and also its defects.
5. Describe the production of oxygen gas, and point out any precautions that you think ought to be observed in conducting the process.
6. Give the formulæ for representing the compositions of hypochlorite and hypophosphite of calcium.
7. Describe the composition and mode of production of chromic acid, and point out a possible source of failure in conducting the process for its production.
8. Point out the distinction between the atomicity and basicity of the organic acids derivable from alcohols of the fatty group, and show their relation to the respective aldehydes.
9. Give the formulæ for representing *cane sugar, grape sugar, alcohol, aldehyde, lactic acid, oxalic acid, natural salt of sorrel, artificial salt of sorrel.*

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Hours—Ten till Two.

1. Describe the construction, the mode of action, and the principles involved in the action, of the syphon.
2. Describe the essential characters and properties of an emulsion, and the conditions most favourable for the formation of emulsions of oils, resins, and olco-resins.
3. What is the mode of action of charcoal as a decolorizing and also as a deodorizing agent?
4. Explain the term "dimorphous."
5. What are the principal sources of iodine, the method by which it is obtained in a free state, and finally purified?
6. What are the distinctive characters of the metals?
7. Describe cyanogen, its production, properties, and some of its compounds.
8. What are the conditions under which alcohol may be obtained from cane sugar? Describe the various changes that occur, and the means by which the alcohol may finally be rendered anhydrous.

SESSION.

EXAMINATION FOR SILVER MEDAL AND CERTIFICATES.

Time allowed, 3 hours.

1. What is the weight of an ounce of *spirit of nitrous ether* of the Pharmacopœia?
2. Explain the principle of action of the *hydraulic press*, and the means by which Bramah succeeded in rendering the application of this principle available in the production of great pressure.
3. What is the physical condition of the luminiferous ether in the production of light, both as common light and as polarized light? How is polarized light produced, and what are its peculiar properties? What is a *Nicol's prism*, and how is it constructed?
4. Describe the Pharmacopœia process for the production of hydrochloric acid, and explain the objects for which the several parts of the process have been adopted.

Time allowed, 3 hours.

5. Describe Leblanc's process for the production of carbonate of soda. Point out the impurities usually present in the product obtained by this process, and means by which it may be freed from such impurities.
6. What are the natural sources of zinc, and the method by which the metal is obtained from its ores in this country? What is the melting point of zinc, and what are its properties at temperatures below its melting point?
7. Describe the constitutions of alcohols, aldehydes and ketones; their respective relations and their sources.
8. What are the natural and artificial sources of benzoic and salicylic acids, their compositions, and the methods by which they are prepared?

Professor Bentley was then called upon to give his—

REPORT ON THE BOTANY AND MATERIA MEDICA CLASS.

Professor BENTLEY said his senior colleague always relieved him of a great deal of that which he could not say half so well, and his observations would therefore be as brief as possible, but it would not be doing justice to the Council or to the students if he did not cordially reiterate that which had been said by Professor Redwood, in saying that on no previous occasion had he ever been able to speak in higher terms of the regularity, diligence, and progress generally, than he could with regard to the past session. It might be said that this was the tale which was always told, and so it was, for he had never had occasion to speak otherwise, but that which he had said in former years he might repeat with still greater emphasis on the present occasion. Professor Bentley concluded by mentioning the names of the successful candidates in his class.

The PRESIDENT then presented the prizes and certificates awarded to the members of this class as follows:—

BOTANY AND MATERIA MEDICA CLASS.

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal ..... Thos. Goddard Nicholson.

Certificates of Merit ..... Fredk. Wm. Short. Richd. Augustus Cripps. T. Staddon Waymouth. Walter Clark Drew.

SECOND COURSE.

Bronze Medal ..... Henry Hamilton.

SESSION. TEN MONTHS.

Silver Medal ..... Frederick Wm. Short.

Certificates of Honour ..... Equal. George F. Callaway. Thos. G. Nicholson. Walter Clark Drew. Equal. Rd. Augustus Cripps. Fredk. Jas. Yeatman.

Certificates of Merit ..... Edward Marsh. T. Staddon Waymouth. Edgar Haward.

The following are the questions which were set for these examinations:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *till* 2.

1. Describe the structure of pitted vessels, scalariform vessels, sieve tubes, and laticiferous vessels.
2. Describe the structure of the bark in a Dicotyledonous plant.
3. Explain the terms superior, inferior, simple, and

compound, as applied to the ovary. Define the following terms as applied to fruits:—Apocarpous, syncarpous, legume, follicle, drupe, achenium, capsule, and cremocarp.

4. Give a general sketch of the changes which the crude sap undergoes in the leaves. What is metastasis, and what are degradation products?

5. What are the botanical and geographical sources of Cusparia bark? Describe its physical and chemical characteristics, and mention what barks have been substituted for it, and how they may be distinguished.

6. Describe the botanical and geographical sources of Asafœtida. Describe its chemical characters, and enumerate its official preparations.

7. Describe the botanical characters of chamomiles. Show how they may be distinguished from the capitula of other plants. What are their chemical characters, and what are the official preparations of chamomiles?

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES OF MERIT.

Hours from 10.30 *till* 2.

1. Distinguish between parenchyma, prosenchyma, and vascular tissue.

2. Define the following:—Epiphyte, parasite, saprophyte, rootcap, rhizome, tuber, corm and bulb. What are the distinctive characters between roots and leaves?

3. Define the following terms as applied to leaves:—Primordial, decussate, fascicled, palmate, pinnatifid, crenate, runcinate, pedate, retuse, ovate, cordate, reniform.

4. What is an acropetal inflorescence? Define an amentum, corymb, panicle, umbel, capitulum, and verticillaster.

5. Enumerate the official plants of the Menispermaceæ. Describe the botanical and geographical sources of Calumba Root, its general characters and chemical composition, and enumerate its official preparations.

6. What are the botanical and geographical sources of Colocynth Pulp? Describe its mode of preparation, general and chemical characters, and enumerate its official preparations.

7. What are the geographical and botanical sources of Balsam of Peru? How is it obtained, and what are its general and chemical characters? Enumerate its official preparations.

SILVER MEDAL AND CERTIFICATES.

Hours from 10 *till* 1.

BOTANY.

1. What is a Primordial cell? Describe the chemical and general characters of the cell-wall and of Protoplasm.

2. Give a sketch of the general distinctive characters between Plants and Animals.

3. Define the following terms as applied to leaves:—Amplexicaul, decurrent, verticillate, equitant, pinnate, palmatifid, serrate, hastate, decompound, pulvinus, tendril, and phyllode, and illustrate by examples.

4. What do you understand by Determinate and Indeterminate Inflorescences? Define a cyme, fascicle, spike, raceme, spadix, and locusta, and illustrate by examples.

5. Define the following terms as applied to the andrœcium and gynœcium:—Innate, versatile, gynandrous, exserted, synantherous, didynamous, simple pistil, gynophore, apocarpous, and syncarpous, and illustrate by examples.

6. Give the essential characters of the following natural orders, and enumerate their official plants:—Cruciferæ, Rosaceæ, Labiatæ, Solanaceæ, Polygonaceæ, and Liliaceæ.

Hours from 2 *till* 5.

MATERIA MEDICA.

1. Mention the botanical and geographical sources of Guaiacum Resin. Describe how it is obtained, its physical and chemical characteristics, and the means of detecting it when employed to adulterate Scammony.

2. Describe the general and chemical characters of official Myrrh; mention its botanical and geographical sources, the substances used to adulterate it or which are substituted for it, and enumerate its official preparations.

3. What do you understand by Balsam? Describe the botanical and geographical sources, and the general and chemical characters of Benzoin, and enumerate its official preparations.

4. What are the botanical and geographical sources of Nux Vomica? Describe the general and chemical characters of these seeds, and give the doses of Nux Vomica and Strychnia, and of the official preparations in which they are contained.

5. Describe the characters of the Mealy and Non-Mealy Sarsaparillas of Pereira. What kind of Sarsaparilla is official, and what are its botanical and geographical sources, and official preparations?

6. What is Saffron? Describe its characters, and mention the substances which are used in its adulteration, and the means by which they may be detected.

The President then called upon Professor Attfield for his—

Report on the Practical Chemistry Class.

Professor Attfield said his report respecting the Class of Practical Chemistry would, as usual, be based on the two reports which it was his duty to present to the Council at the close of the session, one giving the general statistics of the class, and the other setting forth the result of the examination for prizes. With regard to the former he might condense all that he had said to the Council in one sentence, and that was, that comparing the session with perhaps the last five previous years, they had had, as regards numbers and period of study, a good average session. He was happy to report that of the whole number of students fully 40 per cent. were with him for the whole of every day of the whole session of ten months. The attendance was very good, the diligence of the students was unquestionable, and their progress very satisfactory, whilst with regard to their general behaviour it was, as he had been glad to say on every occasion, that of gentlemen. At the close of the session an examination was held, extending over two days, when fourteen students competed, six of whom obtained sufficient marks to qualify them for medals or certificates. The standard number was 100, and the gentleman who stood first on the list obtained the full number, whilst the next in order obtained 85, 80, 65 and 60. Before sitting down he should like to allude to two incidents which had given him great pleasure, and which would, he felt sure, please the Council, under whose supervision the School of Pharmacy was conducted, and his colleagues and the assistants in the School. The first was the receipt of a letter from one of the past year's students, a gentleman who had taken several prizes, a portion of which he would read. He said, "By the spirit which is infused into the students at the Society's school, one feels as if knowledge is introduced to us not as a mere acquaintance who will be forgotten after having carried us over the examination, but as a friend who will accompany us along the path of life, always ready to bring willing aid in professional and other difficulties, and perhaps coming to help us unawares by introducing us to her colleague, discovery. A mere acquaintance is soon forgotten, but if we are taught to love knowledge we generally

remain faithful to her, and are sure to receive the reward in after life. Thus the true object of education is gained. Believing these to be the feelings not only of myself, but of my fellow students, I remain," etc. And then followed the name, which he was asked not to mention. The other matter he wished to allude to related to the present session, and it was that they had a larger number of students than had entered in October for several years; in the laboraties there were very few benches to spare.

The PRESIDENT then presented the prizes and certificates awarded to members of this class as follows.—

SESSION. TEN MONTHS.

Silver Medal	Frederick Wm. Short.
Bronze Medals	Fredk. Jas. Yeatman. Richd. Augustus Cripps.
Certificates of Merit	Edgar Haward. Walter Clark Drew.

The President also handed to Mr. Frederick William Short a copy of the 'Pharmacographia,' and one of 'Science Papers,' presented by Mr. Thomas Hanbury, in memory of his brother, Mr. Daniel Hanbury, to students taking a silver medal.

The following are the questions which were set for this examination:—

PRACTICAL CHEMISTRY.

July 17*th and* 18*th*, 1882.

Hours 10 *to* 5 *each day.*

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

1. Ascertain what salts are present in the "Saline" medicine handed to you.

2. How much real Hydrocyanic Acid is present in the "Diluted Hydrocyanic Acid" supplied to you?

SECOND DAY.

3. Examine the accompanying sample of "Urine" and state the results.

4. In the specimen of "Reduced Iron" given to you how much free iron is present?

NOTE—*Manipulation as well as results will be scrutinized.*

Professor Bentley was then requested to report with respect to the result of his examination of the herbaria sent in by competitors for—

THE HERBARIUM PRIZE.

Professor BENTLEY said if time had permitted he should have liked to say a good deal on the advantage of the study of practical botany which the Herbarium prizes offered by the Council were intended to stimulate, because the time for studying practical botany was when students were engaged in the country during their apprenticeship. He was very pleased to report that this year there had been a very good competition; last year there was only one collection sent in, but he was glad to notice that the gentleman who forwarded it had won several honorary distinctions during the past session. This year there were five collections, all of which were worthy of notice. It entailed a good deal of labour to examine them, but it was a labour of love. The first one, which obtained the silver medal, contained over six hundred specimens, and he thought the best thing he could say about it was to ask everyone present to go and look at it and judge for themselves. The next two, to which bronze medals were awarded, were also very good, and the next two well deserved the certificates of merit which were awarded to them. He hoped that many of those who inspected these collections would be stimulated to do similar work on a future occasion.

The PRESIDENT then presented the prizes and certificates awarded in this competition as follows:—

HERBARIUM PRIZE.

Silver Medal		Henry Hamilton.
Bronze Medals	Equal.	F. V. Butterfield. Thos. G. Nicholson.
Certificates of Merit		Henry Edward Skyrme. Edward Henry Farr.

THE COUNCIL EXAMINATION PRIZES.

The PRESIDENT next stated the result of the competition for the Council Prizes, which were awarded to those who passed the best examination for the higher qualification in each year in the three subjects of Pharmacy, Botany, and Practical Chemistry, irrespective of where they had studied. The first and highest award was the silver Pereira medal, with books value £5, presented by Mr. Hyde Hills; the second was the Council medal, with books value £3; and the third a bronze medal, and books value £2. The examination was conducted in July last by Mr. Gibson and Dr. William Inglis Clark, members of the Edinburgh Board of Examiners, and as neither of these gentlemen was present, he would briefly state the result. The standard number of marks for the three subjects was 1000, and the first candidate obtained 829, the second 756, and the third 689. It was satisfactory to find that, although this examination was conducted by two gentlemen residing north of the Tweed, their report was confirmatory of the conclusions arrived at by the Professors in London, since Mr. Short, who had already taken the silver medal in each class, had been recommended as most worthy to receive the Pereira medal. He might remind the meeting that Mr. Short had been the "Bell Scholar" for the past year.

The President then presented the Council Examination Prizes as follows:—

Pereira Medal (Silver); and Books value £5, presented by Mr. T. H. Hills.

Frederick William Short.

Pharmaceutical Society's Medal (Silver); and Books value £3, presented by Mr. T. H. Hills.

William Kirkby.

Pharmaceutical Society's Medal (Bronze); and Books value £2, presented by Mr. T. H. Hills.

Frederick James Yeatman.

The following are the questions which were set for this examination:—

BOTANY AND MATERIA MEDICA.

Time: 10 *a.m. to* 1 *p.m.*

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

BOTANY.

1. Describe the processes of Cell formation, and show how these processes are involved in the reproduction of the lower Cryptogams.

2. What gases commonly exist in Plants? Describe the circulation process, and how it is affected by external influences.

3. Describe the inflorescence of the Oat; and explain how fertilization is effected.

4. Mention the official orders of the sub-class Calycifloræ, and give the distinguishing characters of such of them as yield indigenous medicinal plants.

MATERIA MEDICA.

1. What are the botanical sources and distinguishing characteristics of true and false Pareira Root? Name the principle of true Pareira, and mention any other plants in which an analogous substance is to be found.

2. State the official process for the preparation of Morphia and give the tests for its recognition and purity. What is Apomorphia? How does it differ from Morphia in constitution, and in physiological action?

3. What is Araroba? State its composition, and in what tissues of the plant it occurs, and give your opinion as to how it may be formed.

4. What is the botanical source, and natural order of the plant yielding Papaw-Juice? State clearly what you know regarding its properties, and how the active principle may be isolated.

CHEMISTRY.

Time: 2 to 5 p.m.

In framing answers, candidates should not enlarge upon the questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

1. Explain what is meant by the ortho, meta, and para series of Benzol compounds, and give the relations of Salicylic and Benzoic Acids.

2. A mixture contains Aldehyde, Alcohol, Cane Sugar and Glycerine. How would you (1) detect the presence of these substances, and (2) approximately estimate the proportions present?

3. A sample of vinegar contains Sulphuric and Hydrochloric Acids, Sodium Carbonate has been added so as to neutralize these acids and part of the Acetic Acid. How would you estimate the Acids present, free and in combination? Working details should be given.

4. What is dissociation? How is it proved,
   a In the case of Water,
   b. In the case of Ammonium Chloride?

5. Syr. Ferri Iodidi is suspected to contain Hydrochloric and Phosphoric Acids. How would you prove this?

6. Explain (by means of equations) the action of (1) Nitrous Acid on Ammonia, (2) Zinc on dilute Nitric acid, (3) Ammonia on Chlorine, (4) Chlorine on a cold solution of Caustic Potash.

The Bell Memorial Scholarships.

Mr. Ekin, being called upon to state the result of the competition for the Bell Scholarships, said that twenty candidates had presented themselves, eight from London and twelve from other centres, and he was glad to state that the papers generally were decidedly satisfactory. The Council had fixed the proportion of the total marks as being necessary for the award, and six of the candidates obtained that number; the papers of the two successful men being eminently satisfactory. These were—

William Edward Crow.
Edward Baily.

The President congratulated the new "Bell Scholars," and handed to each books of the value of £2 10*s*. presented by Mr. Thomas Hyde Hills.

The following are the questions which were set for this examination:—

Time allowed: Three hours (12 *to* 3).

In awarding marks the neatness and legibility of the writing will be taken into account.

LATIN.

1. Translate into English:—

"Diverso interea miscentur mœnia luctu;
Et magis atque magis, quanquam secreta parentis
Anchisæ domus arboribusque obtecta recessit,
Clarescunt sonitus, armorumque ingruit horror.
Excutior somno, et summi fastigia tecti
Ascensu supero, atque arrectis auribus adsto;
In segetem veluti quum flamma furentibus Austris
Incidit, aut rapidus montano flumine torrens
Sternit agros, sternit sata læta boumque labores.
Præcipitesque trahit silvas; stupet inscius alto
Accipiens sonitum saxi de vertice pastor.
Tum vero manifesta fides, Danaumque patescunt
Insidiæ."

2. Parse the concluding sentence of the above quotation.

3. Translate the following prescription into full Latin:—

"Take of—
Strychnia, one grain.
Disulphate of quina, two scruples.
Dilute hydrochloric acid, fifty minims.
Tincture of orange peel, one ounce and a half.
Compound infusion of gentian to one pint.

Mix and make a mixture. Let the patient take two tablespoonfuls three or four times a day."

4. Decline the Latin substantives employed in your translation of the above prescription.

ENGLISH.

1. Write a short essay on Courage.

2. Parse the following lines:—

"I wish thy lot, now bad, still worse, my friend;
For when at worst, they say, things always mend."

ARITHMETIC.

1. Divide the product of $5\frac{3}{7}$ and $4\frac{6}{9}$ successively by their sum and their difference.

2. What weight added to ·278 of a pound will equal ·729 of a kilogramme? Express the weight in grammes.

3. A collier working ·645 of the week and spending $\frac{13}{14}$ of his earnings, saves 2*s*. $10\frac{1}{2}$*d*. per week. What will be the sum of his annual savings should he work $\frac{6}{7}$ of every week, and spend ·562 of his earnings?

4. The melting point of stearic acid is 69·2° C. Convert this into degrees Fahrenheit and Réaumur; and also state how many degrees C. and R. correspond with +52° F. and −17° F.

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

FRENCH.

Translate into English:—

"A quelque temps de là, un pêcheur qui avait tendu ses filets non loin du pied de cette tour, fut tout étonné, en les retirant, d'y trouver quelque chose de lourd: c'était le plat d'argent du Masque de fer; comme cet homme simple ne savait pas lire, il pensa que ce plat était tombé par megardé dans les flots, et se hâta de le reporter au gouverneur, dans l'espoir d'une récompense."

And:—

"Mettez l'huile dans un flacon d'une capacité telle qu'il en soit presque entièrement rempli; introduisez le phosphore, et faites chauffer pendant quinze à vingt minutes, au bain-marie, en ayant soin d'agiter vivement de temps en temps."

GERMAN.

Translate into English:—

"Der Freheitskampf der Deutschen gegen Napoleon.

"Diese Geschichte umfasst einen Zeitraum von nicht mehr als drei Jahren; aber das Gemüth fühlt sich wunderbar gehoben, wenn es die Ereignisse berschaut,

die sich in der Spanne ven Zeit zutrugen. Wir sahen ganz Europa und einen grossen Theil Asiens in Bewegung für die Sache der Freiheit. Deutschlands Fürsten, durch der Ränke des Auslandes auf immer, wie man meinte aus einander gerissen, boten sich von neuem redlich die Hand. In den Völkern erwachte eine Begeisterung wie in den Tagen der Kreuzzüge."

Time allowed: Two hours (4 *to* 6).

In awarding marks, the neatness and legibility of the writing will be taken into account.

CHEMISTRY AND PHARMACY.

1. In making Extract of Henbane, the directions are to heat the juice to 130° and filter, and again heat to 200° and filter. What is the nature of the substances left on the filter in each case, and why are they separated?

2. Give the composition and mode of preparation of Glacial Acetic and Glacial Phosphoric Acids, and explain the meaning of the word Glacial.

3. Why is Sodium Acetate used in making Syrup of Phosphate of Iron and Chloride of Ammonium in making Solution of Perchloride of Mercury?

4. How much Iron is required to make 100 grammes of Ferrous Sulphate?

5. Give the formulæ for Sodium Hydrate, Arseniate, Bicarbonate, Carbonate, Nitrate, Phosphate, Chloride, and Sulphate.

BOTANY.

1. Describe from memory, as nearly as you can, the flower, leaves, etc., of the common Buttercup, and enumerate other plants belonging to the same family.

2. Describe an Apple, Strawberry, and Gooseberry.

Inaugural Sessional Address.

Mr. Joseph Ince then delivered an address to the students, which will be found on p. 281, *et seq.* At the conclusion of the Address—

Professor Chandler Roberts, F.R.S., proposed a vote of thanks to Mr. Ince for the instructive address and rich literary effort all had heard with so much pleasure. At first he was at loss to see why a metallurgist was permitted to propose this motion; but he thought he saw the reason for the President's selection. Metallurgy and pharmacy certainly had a common origin, for at the time when Paracelsus was attempting to introduce order into medicine, Biringuccio was building up the science of metallurgy. Perhaps another reason was that an early volume of the 'Philosophical Transactions of the Royal Society' contained an admirable paper giving a description of work done by Mr. Carteighe, not in pharmacy, but in metallurgy. Mr. Ince had told them that conduct was fate, and the whole public must feel very strongly that the fate of every one must depend in great measure on the accuracy of the chemist's knowledge. Any body of students was very fortunate in beginning its career under such sympathetic influences as those of Mr. Ince, and he had much pleasure in proposing a vote of thanks to him.

The Vice-President (Mr. Atkins) seconded the motion with very great pleasure. He thought this address was the crown of all Mr. Ince's previous performances, and he could not find a phrase which would more aptly express the perfection and beauty and the exquisite symmetry of that address than the one applied by Mr. Ince to Dr. Pereira, where he said that "having the gift of speech and a singularly buoyant temperament, he was clear in statement and brilliant in illustration." No words of his own could so fully express the beauty of the historical *résumé* of pharmacy and the admirable advice given to those who were entering on their studies. His own feeling, as one who had passed the meridian, was, "Oh! that he were just entering on his career, looking forwards instead of looking backwards, and that it had been his privilege as a young man to have been inspired, as he felt he should have been, and go forward on the path of work, he trusted successfully."

The vote of thanks having been carried by acclamation,

Mr. Ince, in reply, expressed his appreciation of the compliment, and said it was often a matter of regret with him that he was separated so much from the public work of pharmacy, and he was therefore very glad of this opportunity of renewing his connection with it.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Borough Police Court, Halifax, on Friday, September 22, before Messrs. Barstow and Buller, John Gledhill, of 90, Gibbett Street, was charged with having unlawfully sold to George Revill Templeman, of 23, Burlington Chambers, New Street, Birmingham, Assistant Secretary to the Chemists and Druggists' Trade Association of Great Britain, a certain poison, to wit, laudanum, the same being a preparation of opium, and not labelled with the name and address of the seller, contrary to the statute in such cases made and provided.

Mr. Henry Glaisyer, Solicitor of the Association, conducted the prosecution, and Mr. Storey appeared for the defence.

Mr. Glaisyer said this was a case under the 17th section of the Pharmacy Act, 1868, which enacts that it shall be unlawful to sell any poison, either by wholesale or by retail, unless the box, bottle, parcel or wrapper, in which the poison is contained, be distinctly labelled with the name of the article, the word "poison," together with the name and address of the seller of the same. He then proceeded to quote from the case of Templeman *v.* Trafford, which was heard before Mr. Justice Grove and Mr. Justice Lopes, in October last, who held that the seller within the meaning of the Act was the person who had actual control of the business where the sale took place. At the time of such sale the defendant was not a registered chemist, and had no right to sell poison at all.

Mr. G. R. Templeman said he was Assistant Secretary of the Chemists and Druggists' Trade Association, and resided in Birmingham. On Monday last he went to the shop of the defendant, at 90, Gibbett Street, and there purchased from him personally twopennyworth of laudanum; the bottle containing the laudanum was labelled, "Charles Brierly, Chemist, Raglan Street and Gibbett Street, Halifax. Poison. Laudanum." He saw several other parcels in the window labelled with the name and address of the defendant; the defendant's name also appears on a sign over the front of the shop.

Cross-examined by Mr. Storey: He purchased a halfpennyworth of linseed meal at the same time, and stated that he required it to make a poultice, and the laudanum was required to sprinkle on it and not to be taken inwardly.

Mr. Storey said his client would plead guilty. He had never sold any poison previous to this case; he was a young man about twenty years of age, who had purchased the business in question, and was endeavouring to pass his examination as a chemist, and it was not until he had ascertained from the complainant that he required it for an outward application, and from his appearance he thought him a person whom he might

safely trust with that quantity of poison that he had sold it; after taking these facts into consideration he trusted the bench would deal very leniently with him, and only inflict a small fine, and he would promise not to again repeat the offence.

The Chairman of the Bench: The sale of poisons to the public by unqualified persons was a very serious offence, as they could never tell what consequences might ensue; they had decided to deal very leniently with him this time, and trusted he would take care not to offend again. He would be fined 20*s.* and costs 7*s.* 6*d.*

Alleged Death from Lead Poisoning.

The adjourned inquest touching the circumstances attending the death of Wilson Riley, mechanic, of Keighley, who died on August 26, from the supposed effects of lead poisoning, was held on Tuesday, September 26, in the Keighley Police Court, before Mr. J. P. Brown, Coroner.

Considerable interest was manifested in the inquiry.

The Keighley Local Board was represented by Mr. Tindal Atkinson, barrister, of Leeds (instructed by Mr. George Burr, clerk to the board).

There were also present Messrs. R. L. Hattersley (Chairman of the Board), B. S. Brigg, John Gledhill, Dr. A. Roberts (Medical Officer of Health), Dr. Dobie, Dr. Jack, and a number of other medical gentlemen.

Mr. Tindal Atkinson, on behalf of the Local Board, said he had a very important witness whom he should like to call—that was Professor Tidy, of London, who had considerable experience in chemistry and cases of the kind they were inquiring into. He was, however, away in Scotland, and he should ask for a further adjournment after the additional witnesses had been examined.

The viscera of the deceased and a sample of the town's water from the mains and tap of the deceased's late residence had been submitted to Mr. Alfred H. Allen, of Sheffield, for analysis, and following is an extract from his report supplied to the Coroner:—

"A doubtful trace of lead was found in the kidneys, but in the liver and spleen a notable quantity of lead and copper was found. There was $\frac{1}{8}$ of a grain of lead in one-half of the liver. That amount was smaller than they might expect to find in the liver of a person who was poisoned by lead, but he had not unfrequently noticed very insignificant amounts of lead in the viscera of cows and other animals that had undoubtedly met their death by lead poisoning. He attached no importance to the finding of copper, as he had met with it in several other instances. He had examined a sample of water from the tap in the deceased's dwelling-house, and found that it contained $\frac{3}{5}$ of a grain of metallic lead per gallon. The proportion was amply sufficient to produce poisonous effects, but some persons appeared to be more sensitive to the influence of lead than others. Speaking generally, anything over $\frac{1}{10}$ of a grain of metallic lead per gallon of water was a dangerous contamination. He had known $\frac{1}{8}$ of a grain of lead produce severe symptoms of lead poisoning. On examining a sample of the water taken direct from the mains he did not find any trace of lead, but it contained a distinct trace of mineral acid. The water, by remaining in contact eighteen hours with a strip of clean lead, became contaminated with lead to the extent of 0·56, or over $\frac{1}{2}$ a grain per gallon. A repetition of the experiment showed that 0·45 of a grain of lead was taken up in fourteen hours. Those proportions of lead would render the water highly injurious to a person who drank it regularly. When the water in question was rendered faintly alkaline with lime water, and left in contact with lead over one night, it took up the smaller quantity of 0·14 grain of lead per gallon. From the experiments he considered it was the free acid in the water that gave it so great a tendency to act on the lead. He found that Sheffield water took up a small trace of lead during one night, but Rotherham water took up no trace of lead after two nights' contact with metal."

Mr. Allen was called, and said he arrived at the conclusion, when he found no lead in the heart, that it had been eliminated by medical treatment. On good authority he believed that a person under medical treatment could be freed from lead in a fortnight, but the organs would show deterioration.

By Mr. Tindal Atkinson: One-fifth of a grain was not sufficient to cause death, but it would cause paralysis.

Dr. William Dobie was then called. In examination by Mr. Atkinson, he said that disease of the kidneys generally accompanied lead poisoning. They might find symptoms of paralysis without lead poisoning, but in aggravated cases of lead poisoning paralysis was generally found.

By the Foreman: The deceased might have died from granular disease, caused by lead poisoning. (1) Lead poisoning was a very common cause of granular disease. (2) During life there were unmistakable signs of lead poisoning. (3) Lead was found in the tissues after death.

By Mr. Atkinson: Witness had treated deceased for lead poisoning about two years ago. Lead might be eliminated from the system after ten days of medical treatment. He accounted for the absence of lead in other organs of the deceased from the fact that it was being rapidly eliminated from the system by medical treatment.

Dr. William Jack, who attended deceased up to the time of death, gave his opinion that the cause of death was lead poisoning.

Further evidence having been given, the case was adjourned for a week to allow Professor Tidy, of London to be present to give evidence as to the quality of the water supplied by the Local Board.

The adjourned inquest was held on Tuesday last at the Court House, Keighley, before Mr. T. P. Brown, Coroner.

Charles Meymott Tidy, M.B., Master of Surgery, and medical adviser to the Home Office, was examined. He said he had had great experience in cases of poisoning. He had been called upon to make analyses in several cases of lead poisoning. He had never had before him a case of death resulting from chronic lead poisoning. Lead poisoning was not the actual cause of death, but it had preceded death. Deaths caused by lead poisoning were very rare occurrences. When lead poisoning was very advanced, he invariably found paralysis of the muscles—especially the muscles of the wrist. He did not know of any case of lead poisoning but what was attended by paralysis of some kind, but during his experience he never knew of an actual death from lead poisoning. Granular disease of the kidneys resulted in some cases from lead poisoning. He had read Mr. Allen's report, and he was astonished to see the small amount of lead found in the system, for in one case, which had not resulted in death, he found 5 grains of lead in the spleen and 4 grains in the liver. Iodide of potassium was a remedy against lead poisoning, but it was difficult to get it from the system. The effect of iodide of potassium on the system was to render the lead insoluble and inert. It was very difficult to say in this case what was the cause of death, because he was not present when the *post-mortem* examination was made. There was very little lead found, and that led him to suppose that death had probably been caused by granular degeneration of the kidneys. There was no evidence of disease of the nerve centre.

Dr. Jack, who attended the deceased, was recalled and make additional remarks. He said the deceased vomited, but the vomit had not the appearance of being caused by

disease of the kidneys. The deceased was never above the natural heat. The temperature always rose from inflammation. The deceased's breath had a peculiar fetid odour, which he had never noticed before except in cases of severe lead poisoning. He also complained of pains in the arms and legs, which constantly shifted. Shortly before death convulsions set in, and the deceased was attacked by severe pains. All the medical men were of opinion at the *post-mortem* examination that the deceased had died from lead poisoning.

The Coroner, in summing up, said the jury need not attach any importance to the small quantity of lead found in the deceased.

Mr. Atkinson, addressing the jury, said whatever the result of the inquiry might be, he was instructed by the Local Board to say that the most searching investigations would be made with regard to the town's water.

The Jury retired to consider their verdict, and after being absent for two hours, the Foreman handed in the following verdict:—"We are of opinion that the deceased, Wilson Riley, died from granular disease of the kidneys, but how caused we are unable positively to say; but death was accelerated by lead poisoning."—*Leeds Mercury.*

Poisoning of a Chemist and Druggist by Prussic Acid.

Mr. Carttar, West Kent Coroner, held an inquest on Tuesday, October 3, at New Cross, on the body of Joseph Quinlan, aged 43, chemist, 457, New Cross Road.

Annie Quinlan, the widow, identified the body, and said deceased for twelve months had suffered from depression and nervous debility. On Sunday morning last he left home, and returned with some chloroform, which he was in the habit of taking. He went upstairs, and finding him taking some she tried to take the bottle from him, but could not. He went out again twice, but returned without any chloroform, and went upstairs. She again followed him on his knocking on the floor with his foot, and found him drinking something from a bottle, which she knocked out of his hand, and he then fell backwards. She then sent for Dr. Gordon, who immediately attended, but her husband shortly afterwards expired. She had never seen him take any drug as an antidote to chloroform, or heard him threaten to commit suicide.

Dr. Gordon, of 10, Amersham Road, New Cross, said he spoke to Mr. Quinlan professionally on Friday last, when he was suffering from the effects of chloroform and intoxication. About four years ago witness discovered him insensible in his own shop from chloroform. When he recovered witness found he had been in the habit of taking chloroform to produce oblivion and drown care. Witness had attended him professionally, but within the last year he took chloroform to such an extent, and became so violent under its influence, that witness declined to have anything more to do with his case. Witness told him he would be one day found dead, and there would be a coroner's inquest, and he replied that he did not care how he died. He took enough chloroform to kill an ordinary person over and over again, and witness believed at times he took as much as a pound in twenty-four hours. On Sunday morning witness was called to his house, and found him lying down, and Mrs. Quinlan with him. She said "Oh, Mr. Quinlan has taken prussic acid," and added that when she went upstairs, he said "I have done it at last." The bottle produced had contained prussic acid three times as strong as the Pharmacopœia solution.

After some further evidence, the Jury returned a verdict that he died from an overdose of prussic acid taken by misadventure to produce relief.—*Standard.*

Correspondence.

Liq. Ferri Iodidi.

Sir,—I have just received this day's Journal and note the discussion on my paper on the above subject. I do not wish to make any personal defence of the position I took or of the correctness of any of my observations. My position was sufficiently indicated in the paper itself, where, towards the end I say, "I do not suggest the propriety of adding any foreign matter as a preservative. I have not even suggested the impropriety of such a course," but the pharmacist "had better at least know what he is doing." And regarding the correctness of my observations, I have no respect for an argumentative reply; those who are interested in the subject can very easily try the reactions, and if my reputation suffers, scientific pharmacy at least will be benefited.

Perhaps it is due to scientific accuracy that I should state that the solution of iodide of iron, which I spoke of as pure and free from acid, was of that degree of purity which the B.P. process readily yields, and that degree of freedom from acidity which is indicated by the testing which I describe. The B.P. sample, which was accepted as a standard, was made by one of my apprentices in the ordinary course of trade, and I do not think that any manufacturing chemist can complain that he "had not had a very good time of it at the Conference" (as Mr. Fletcher expresses it), if his preparations have a less close approximation to purity than those made by the pharmacist's apprentice.

I do not think the specific gravity an important test, if purity is doubted. If the gravity were not correct the preparation must be at fault, but if the gravity were all right the preparation might still be all wrong.

I do not know that sulphurous acid makes a muddle of ferrous salts, and I do not know that phosphoric acid always precipitates ferric salts, though the manuals of analysis tell us how to throw down phosphoric acid as ferric phosphate.

It must not be supposed that I suggest adding iron wire to syr. iod. iron. I spoke of liquor and did not recommend anything being added. The iron wire is a very old suggestion, as pointed out by Mr. Fletcher, and I believe often used in preserving the liquor, though I was not aware of its being used in the syrup. If the discussion leads to the more general following of the pharmacopœial process, with attention to the points emphasized by Professor Tichborne (which are not deviations from the official formula), my object will have been attained. I may just add that, though it formed no part of ths object of my paper, I do recommend the exclusion of air as the most important point to be adopted by the pharmacist towards the preservation of the liquor or the syrup of the iodide of iron.

Grey Street, Newcastle. Barnard S. Proctor.

Erratum.—In "The Month," p. 265, col. i., line 20, *for* "$\frac{1}{100}$ gram" *read* "$\frac{1}{100}$ grain."

Inquirer.—The quantity of borax is too great for solution. Shake the mixture until a saturated solution is produced and leave the excess in the bottle.

W.—Mixtures containing quinine and iodide of potassium have on several occasions been the subject of comment under "Dispensing Memoranda."

N. M. G.—*Funkia subcordata.*

Country Chemist.—We do not think that the subject is quite suited for discussion in these pages. It must be evident that, to say the least, the so-called "system" is open to a great deal of abuse.

J. G. F.—Any person whose name is on the Register may carry on the business of a chemist and druggist, whether he is a member of the Society or not. A person who has passed the Preliminary and Minor examinations is entitled to have his name placed on the Register and may then be elected an Associate of the Society. If in addition he passes the Major examination he is registered as a Pharmaceutical Chemist and is then eligible as a Member.

Communications, Letters, etc., have been received from Messrs. Dodd, Abraham, Bedford, Mason, Wilkes, Hall, Bennett, Richardson, Dyer, Baines, Elliott, Minor, Guerra al Cuetiella, F. W. E. S., W. J. S.

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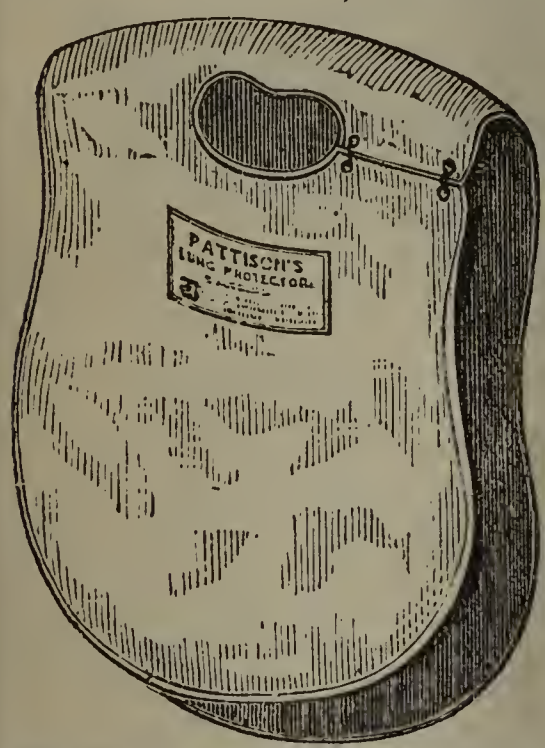

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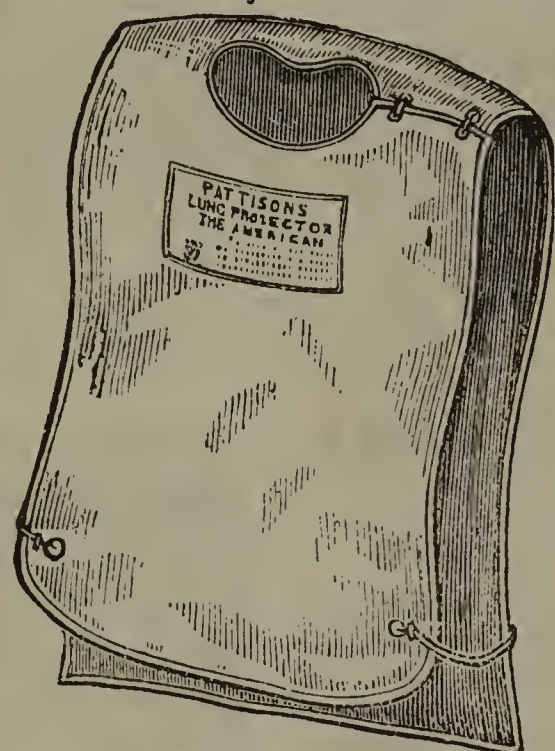

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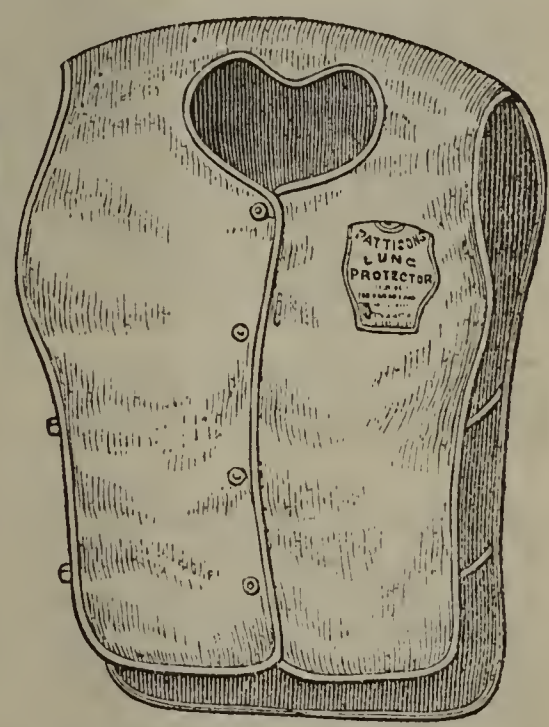

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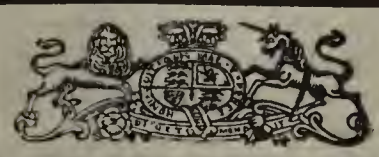

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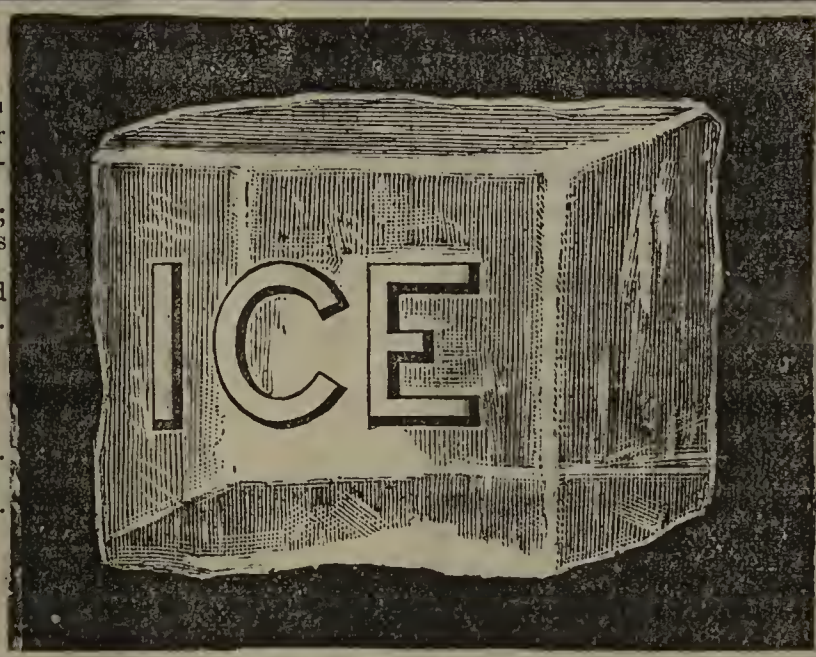

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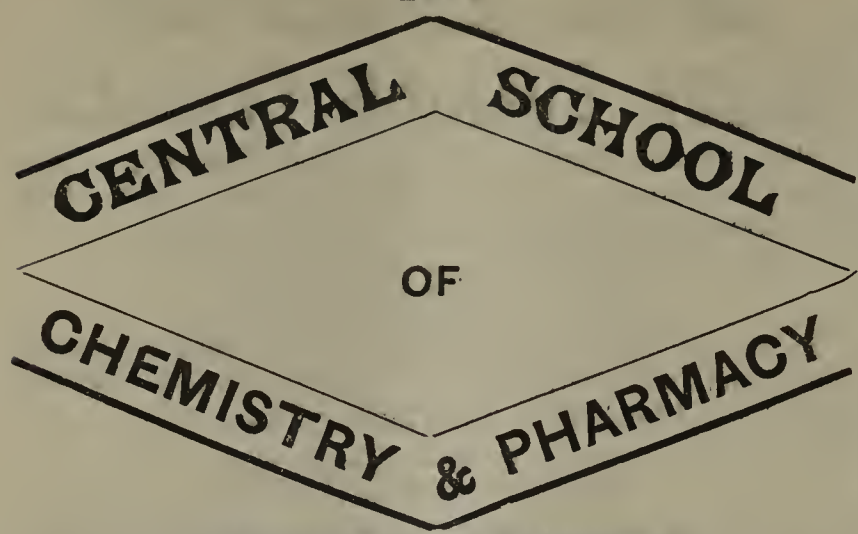

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 642.] SATURDAY, OCTOBER 14, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 1st, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 25th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

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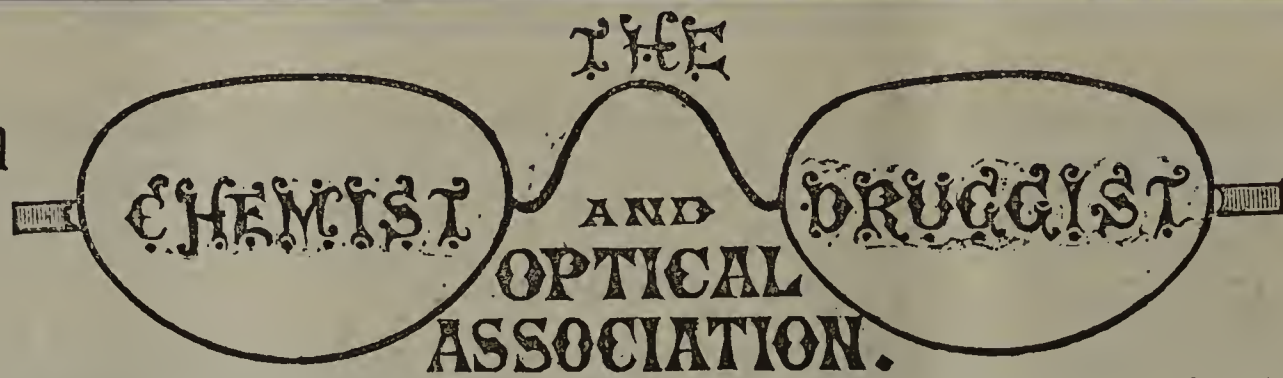

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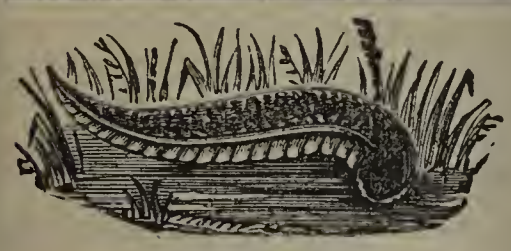

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"New York Medical Journal," *August* 1880, Dr. F. Weir, *in Lecture delivered to the College of Physicians and Surgeons, New York.*

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THE "TAMBOR," A TREE YIELDING A PURGATIVE OIL, WITH DESCRIPTIONS OF TWO SPECIES OF OMPHALEA.

BY W. BOTTING HEMSLEY, A.L.S.

Some twenty years ago, Dr. Dorat, of Sonsonate, San Salvador, Central America, sent to the late Daniel Hanbury dried specimens of a tree called tambor, that was said to yield a valuable purgative oil resembling castor oil in its properties, with the advantage of having a more agreeable flavour. Mr. Hanbury sent one specimen to Kew Herbarium, where it was recognized as a species of *Omphalea*, near, if not identical with specimens collected by Sutton Hayes, at Acajutla, not far from Sonsonate, but apparently different from any described species. Nothing further seems to have been done with the plant. Having to deal with it for the botany of Godman and Salvin's *Biologia Centrali-Americana*, I lately wrote to Mr. E. M. Holmes, the Curator of the Pharmaceutical Society's Museum, asking whether the specimens in the collection under his charge afforded any information beyond those at Kew. He obligingly communicated a copy of a note by Dr. Dorat, together with some particulars of the specimens which were found in the Hanbury Herbarium. Although the material is by no means so complete as one could wish, it is sufficient to show that the plant does not belong to any described species. I have, therefore, described it as far as it goes, as well as Sutton Hayes's specimen alluded to above, which I take to be a second species; and the publication of these descriptions and what is known of the plants, in this Journal, may serve to draw attention to them and be the means of eliciting further information. The genus *Omphalea* comprises about eight known species, one of which is endemic in Madagascar, whilst all the others are restricted to tropical America. This peculiarity in distribution is shared by some other genera of plants, *Ravenala* for example; and it also finds a parallel in the animal kingdom, according to Wallace. The most striking distinctive character of the genus is in the male flowers, or rather in the stamens, of which there are two or three in each flower. They are united and form together a body shaped like a mushroom. The columnar portion is short, and the cap consists of the thickened dilated connectives of the two or three stamens, so that the two cells of each anther are distant from each other, and two cells of different anthers close to each other. In my *O. cardiophylla* the number of stamens is usually two, but there were three in one flower that I examined. All the flowers I examined, both male and female, had a calyx of four decussate sepals, yet it is likely that in these species, as in the others, the number may vary from four to five.

Concerning the "Tambor," Dr. Dorat sent the following note to Mr. D. Hanbury:—"The fruit about the size of a pear, contains three beans, jet black, which, by pressure, yield a very fine oil in large quantity, rather pleasant to the taste, and resembling castor oil in its purgative effect, with the advantage that it does not gripe. The leaf is large (I send a small one), and is used here for packing cheese, on account of its strength. Flowers in December; fruit ripe in February or March. The seeds are covered with an exceedingly hard, black, thin epidermis, with a white soft pulp containing the oil, which, besides its purgative quality, burns well. Seeds [seed-vessels] grow in large bunches."

This I propose naming *Omphalea oleifera*, and the following is a description of the species as far as the material will permit:—

OMPHALEA OLEIFERA, Hemsley, species nova. *O. foliis amplis fere orbicularibus profunde cordatis stellato puberulis, paniculis brevibus ramosis, bracteis paucis infra pollicaribus, ovario glabro.*

Arbor? ramulis ultimis inflorescentias gerentibus crassocarnosis. Folia (unicum circiter 5 poll. diametro a nobis tantum visum) petiolata, tenuia, papyracea, sparse stellatopuberula (pilis deciduis), suborbicularia, profunde cordata ("ampla, lenta" Doratius), venis primariis lateralibus utrinque 5 vel 6 conspicuis; petiolus in spec. Kewens. omnino deest. Flores monoici, paniculati; paniculæ terminales, latæ, ramosæ, puberulæ; bracteæ paucæ, petiolatæ, angustæ, oblongæ, vix 1 poll. longæ, venosæ, puberulæ; calycis sepala in fl. ♂ ut in fl. ♀ 4, decussata, orbicularia, ciliolata; antheræ 2; ovarium glabrum. "Fructus magnitudine pyri, 3-spermus; semina nigra, oleam gratam purgativam copiose præbentia." —Dorat.

This and the following differ from all the previously described species in having thin, strong, papery leaves, and perhaps also in their very stout ultimate branchlets. This differs too from the common *Omphalea diandra* in having a glabrous, not hairy, ovary; and it differs from *O. cardiophylla* in its leaves being sparsely furnished with stellate hairs, in its short branching, narrow panicles, and in its smaller bracts. These differences are possibly all due to different conditions under which the plants grow; but rather than confuse two species under one name, I will risk making a bad species.

Here is a description of Sutton Hayes's plant numbered 617:—

OMPHALEA CARDIOPHYLLA, Hemsley, species nova, *O. foliis amplis fere orbicularibus profunde cordatis glaberrimis, paniculis angustis elongatis, bracteis oblanceolatis ad 2 poll. longis.*

Arbor 30—40 pedalis (fide Hayesii), ramulis . . . Folia (2 tantum visa) longe petiolata, tenuia, papyracea (in vivis subcarnosa?), glaberrima, suborbicularia, basi profunde cordata, apice acuminata, obtusa (majus fere pedem diametro), undulata; venis primariis lateralibus utrinque 5 vel 6, conspicuis; petiolus (perfectus deest) saltem 4 poll. longus, apice 2-glandulosus, crassus, carnosus, in siccis infra medium crassior. Flores (♂ tantum visi) paniculati; paniculæ angustæ, graciles, terminales (pendulæ?), pedem vel ultra longæ, obsolete puberulæ; bracteæ oblanceolatæ ad 2 poll. longæ, venosæ, graciliter petiolatæ, petiolo 2—4 lineas longo, apice 2-glanduloso; calycis sepala 4, decussata, orbicularia, ciliolata; antheræ 2 vel interdum 3.

THE INFLUENCE OF GUM ARABIC IN CERTAIN CHEMICAL REACTIONS.*

BY J. LEFORT AND P. THIBAULT.

It is known that the presence of certain organic substances in saline solutions may prevent the formation of a large number of precipitates. In this respect, the influence of tartaric acid is familiar to chemists. The researches it is proposed to describe warrant the statement that some neutral bodies, and gum arabic in particular, also enjoy this property.

* *Journ. de Pharmacie et de Chimie*, [5], vi., 169.

Upon this principle is based the therapeutic employment of soluble sulphide of mercury, as described by M. Lambron in a communication to the French Academy of Medicine. M Lambron pointed out that when an aqueous solution of bichloride of mercury is added to the ulphuretted Luchon water a precipitate of sulphide of mercury is rapidly formed which falls to the bottom of the vessel as a black powder. But if instead of introducing the bichloride of mercury directly it be previously mixed with syrup of gum or sarsaparilla, beef tea, albumen or apple jelly, and then poured into the Luchon water, in proportion a little in excess of the sulphur strength of the water, no precipitate is formed even after several weeks of contact. This observation induced M. Lambron to suppose that when bichloride of mercury is dissolved and mixed with gummy and albuminous substances and then poured into the sulphuretted Luchon water, the chemical action is suspended, *i.e.*, no sulphide of mercury is formed. The authors believe that although the experiments of M. Lambron may be correct his interpretation is not admissible.

At first, it might be supposed that the viscosity of the solution was the cause of the non-precipitation. But this is not the case, for if the syrup of gum be replaced by simple syrup or glycerine a precipitate is formed. It would therefore appear that the prevention of the formation of the precipitate is due to the gum or vegetable extract contained in the precipitate, and this was confirmed by the authors' experiments. The reaction is not peculiar to Luchon water and solutions of sulphuretted hydrogen or monosulphide of sodium may be substituted without sensibly modifying the results.

The authors therefore thought it would be interesting to ascertain whether gum equally prevented the precipitation of the different metallic sulphides, using solutions suitably diluted. For this purpose a titrated solution of monosulphide of sodium was prepared containing 1·7 gram of sulphydric acid per litre; on the other hand, a certain number of solutions each also containing a corresponding quantity of a metallic salt per litre; finally, a clear solution of 1 part of gum arabic in 2 parts of water. The observations were made in the following manner:—

Two quantities of 10 c.c. of the solution to be examined were run from a graduated pipette into two glasses of equal volume; with one of these 3 c.c. of solution of gum was incorporated by stirring and to the other 3 c.c. of distilled water was added; finally 10 c.c. of sulphuretted solution was added to each and rapidly mixed. The following table represents what was observed both after a few minutes and some weeks:—

	Without Gum.	With Gum.
Lead acetate . .	Black precipitate.	Clear brown solution.
Silver nitrate . .	Black precipitate.	Clear black solution.
Ferrous sulphate.	Black precipitate.	Clear black solution.
Manganous sulphate.	Rosy flesh-coloured precipitate.	Clear light-brown solution.
Mercuric chloride	Black precipitate.	Clear dark-brown solution.
Copper sulphate .	Black precipitate.	Clear dark-brown solution.
Zinc sulphate . .	White precipitate.	Clear colourless solution.
Antimonous chloride in solution acidified by HCl.	Orange precipitate.	Clear orange solution.
Arsenous acid. .	Citron-yellow precipitate.	Clear citron-yellow solution.

It will be seen, therefore, that under the conditions stated gum prevented the precipitation of metallic sulphides. In concentrated solutions, or when the proportion of gum was very small, more or less incomplete precipitations were observed.

It next appeared interesting to ascertain whether gum has also the power to stop the precipitation of metallic oxides and of alkaloids by the ordinary reagents. The following were the results obtained.

As to the metallic oxides it is unnecessary to enter into details of the experiments, it will be sufficient to say that they behaved like the sulphides in the presence of solution of gum. But since the oxides are, as a rule, much more soluble in water than the corresponding sulphides, metallic solutions of double the strength were used, and a corresponding solution of caustic soda.

The action of gum upon the formation of certain other precipitates was also studied, the following being the results observed:—

	With Gum.	Without Gum.
Neutral phosphate of ammonia and calcium chloride.	White gelatinous precipitate.	Clear colourless solution.
Uranium nitrate and potassium ferrocyanide.	Chocolate brown precipitate.	Clear brown solution.
Very dilute solution of ferric chloride and ammonia.	Brown gelatinous precipitate.	Clear light brown solution.

In a like manner no precipitates were produced in the presence of gum in solutions of 1 in 1000 of the following alkaloids, quinine, cinchonine, morphia, strychnia, brucia, and veratria, by the usual alkaloidal reagents,—phosphomolybdate of ammonia, double iodide of mercury and potassium and tannin. If it be remembered that the separation of alkaloids by their reagents has to be effected in the presence of various organic matters that accompany them either naturally or accidentally, these researches acquire for toxicology an unmistakable importance.

It is necessary also to note that certain vegetable infusions—among others, that of tea—are opposed to the precipitation of sulphide of mercury. The liquid only acquires a darker colour, consequent upon the presence of sulphide of mercury formed; this, however, is the same as happens with gum solutions.

Notwithstanding the numerous instances that have been quoted the non-precipitation of dilute solutions in the presence of gum is not absolutely general. The iodides of lead and mercury, sulphate of barium and carbonate of lead are precipitated in solutions containing gum more slowly, but nearly as completely as in distilled water.

The question arises whether in the presence of these facts it is necessary to conclude that the ordinary reactions undergo modification. Contrary to the opinion of M. Lambron, the authors think it is not. Although precipitation does not take place, it is evident from the intense coloration of most of the gummy liquids, as compared with that of the liquids floating above the precipitates, that the compounds are formed, but that they remain, if not in solution, at least in such a state of division that they pass through any filter; and the microscope, even with the strongest powers, does not reveal any trace of solid matter in suspension. Under these conditions it might be asked whether gum does not possess the property of dissolving metallic sulphides and oxides. Such an interpretation would be inexact, because recently formed precipitates are not redissolved when submitted to the action of a very concentrated solution of gum.

Although the phenomenon has not the generality that might be expected, the authors publish these results as affecting not only therapeutics, but also analytical chemistry and toxicology. It is also suggested that they are worthy of the attention of physiologists, since most of the organic liquids contain gum or analogous sub-

stances, and it is therefore possible to conceive the simultaneous existence in the soluble state in animal or vegetable cells of compounds reacting chemically upon each other.

THE OLEATES AND OLEO-PALMITATES IN SKIN DISEASES.*

At the thirty-third annual session of the Medical Society of the State of Pennsylvania, Dr. J. V. Shoemaker, of Philadelphia, read a paper on the above subject, which is reported in full in the *Med. and Surg. Reporter*, May 13, 1882. Dr. Shoemaker claims to have introduced, for the first time, the use of *chemically true* oleates, in contradistinction to those introduced by Mr. John Marshall in this country, which are here described as simply solutions and not true oleated compounds. Shoemaker's oleates are prepared by the double decomposition of sodium oleate with solutions of neutral salts, the former being prepared by saponification of oleic acid, with a solution of sodium hydrate. A solution of the sodium oleate in eight parts of water is precipitated by a neutral salt, and the precipitate, washed and dried, is the oleate required. The oleates of mercury, atropia, quinia and antimony, with their therapeutical action, were considered, and Dr. Shoemaker claimed to have first introduced the oleates of lead and bismuth in 1879, before the Society. The following oleates were also brought forward and shown for the first time.

1. *Oleate of Zinc*, made by decomposing a sodium oleate with a saturated solution of zinc sulphate, boiling out and drying the precipitate and reducing it to an impalpable powder. One part of this powder, melted with three of a fatty vehicle, makes a suitable ointment. Zinc oleate is a fine pearl-coloured powder, with a soft soapy feel, very much like powdered French chalk. The very best results are obtained from using it simply as a dusting powder, as in cases of excessive sweating of the feet, hands, or other parts, and in seborrhœa oleosa affecting the face; it is the most reliable remedy in eczema vesiculosum, in erythema about the groins and axillæ, and in herpes.

2. *Oleate of Copper*, obtained by double decomposition with a saturated solution of copper sulphate. The washed precipitate melted with either 4 or 9 parts of cosmoline, fat, or lard, gives respectively a 20 or a 10 per cent. of oleate of copper ointment. Applied to the unbroken skin the oleate of copper rapidly penetrates deeply into the parts, particularly into the follicles, and will produce slight stimulation; applied to the broken skin it acts as a stimulant, and an insoluble albuminate is formed, which coats over the surface and supplies the place of the abraded skin. This oleate is specially useful in cases of ringworm, the ointment being lightly rubbed in night and morning; the parts should be well washed with soap and water to start with, but afterwards only every ten or twelve days. Epilation is not always necessary in this method of treatment. This ointment is also a useful application for indolent ulcers, warts, corns, and bunions.

3. *Oleate of Aluminum*, prepared by decomposing sodium oleate with aluminum sulphate; the washed precipitate mixed with equal parts of lard gives the ointment the author uses. This ointment is semi-solid, dark brown in colour, and has a most powerful astringent action. It very rapidly checks mucopurulent discharges in eczema. The author also recommends it as a dressing in foul ulcers, abscesses, sinuses, burns, and scalds; in these cases it coagulates albumen, constringes the vessels, and has an antiseptic action.

4. *Oleate of Iron*; the precipitate thrown down on adding ferrous sulphate to sodium oleate is converted, by boiling, into ferric oleate, and this may either be used pure or made into an ointment with an equal part of a fatty base. "When prepared in the above manner it occurs in a reddish-brown paste, inodorous, leaving a styptic taste and readily soluble in fats, which hold in combination about 30 per cent. of oxide of iron, forming a powerful and important therapeutic remedy." Used topically it is non-irritating; applied to an ulcerating surface it is mildly astringent. The author recommends it for its constitutional, as well as its local effects, advising that a small piece should be rubbed into the axillæ and inguinal regions two or three times a day; from its use in this way he reports "excellent constitutional (systemic) results" in those who had a weak pulse, a pale and flabby condition of skin, and deranged digestive organs, unable to bear the ordinary chalybeates. In scrofula also he has used it with marked effect.

5. *Oleate of Arsenic* obtained by making arsenious chloride by the cautious saturation of hydrochloric acid with metallic arsenic; the solution thus obtained precipitates the oleate required from the sodium oleate. Twenty grains of this with 1 ounce of a fatty base form the author's ointment, which is soft, yellowish, having no action on the skin except when this is abraded, or in wounds, ulcerating and granulating surfaces, in which conditions it will excite active inflammation and destroy the tissues to some depth. It is of value in lupus, especially the ulcerating variety, and also in the tubercular variety after the parts have been thoroughly scraped. It may be applied also in ulcerating epithelioma, in warts, condylomata, nævi, corns, etc.; opium, belladonna, hyoscyamus, and arnica may be combined with it.

6. *Oleate of Silver* is prepared by precipitating sodium oleate with a saturated solution of silver nitrate, washing the precipitate with boiling water, drying it, and reducing it to fine powder. Of this an ointment may be made; strength, one drachm to the ounce. The salt is brownish-yellow in colour, the ointment dark brown, soft and pliable. The simple oleate may be sprinkled over old chronic ulcers, old sores, and exuberant granulations, when it will set up a healthy condition in the parts. The ointment coats over an abraded surface by combining with the albumen, and causes contraction of the blood-vessels; it is valuable, in the strength 10–20 grains to the ounce, as an application in erysipelas, a stronger ointment being used at the margin to prevent extension of the disease. It has been used also in superficial lupus, boils, and carbuncles.

The oleates of magnesium, lithium, calcium, antimony, tin, and others, have been prepared by similar processes, but are at present of little therapeutic value.

The author claims for these oleates the following advantages: their deep penetration; their freedom from rancidity; their cleanliness of application; their great economy; and their antiseptic action.

* From the *Glasgow Medical Journal*, October, 1882.

SPICES OF THE STRAITS SETTLEMENTS.*

Cloves and the Clove Tree.—People that labour under the opinion that cloves do well only in the Moluccas and on the island of Zanzibar are simply mistaken. It thrives splendidly in the Straits Settlement—this wonderful, lovely tree. Many years ago enterprising men on the island of Penang introduced and cultivated the clove tree, and it proved a decided success. It is to be found in some of the gardens of Europeans and wealthy Chinese in the Straits Settlements, producing flowers liberally; and it is a subject for wonder why no one cultivates it more largely, not to serve as an ornament only, but to derive benefit from it. In Penang it was planted for that purpose, and "Penang cloves" have the reputation, like the nutmegs, to be the best in the market, commanding a higher price than Amboyna (Moluccas) and Zanzibar cloves. But the consumption of this spice among the natives throughout the colony (and all India and the East in fact) is so large that the quantity left for export is very limited. It is the bud of the flower just before

* From the *Weekly Drug News*, Aug. 11, 1882

opening that constitutes the spice, and in this lies the difficulty that prevents many from planting cloves for export. One having a quantity of trees will find himself busy about the time the buds (white in colour, and strongly resembling snowdrops) begin to made their appearance. It must not be gathered before it, the bud, is well formed, just before opening; and as on a full-g own tree the number of buds is exceedingly large, the planter must have plenty of hands ready to gather them as quickly as possible, because the bud after opening—becoming a flower—loses much of its strength. Boys and girls from ten to fourteen years old answer best for this purpose. The bud-gathering time lasts a few days only, and whoever does not "make hay while the sun shines" will lose his crop of buds. The buds after being gathered are spread on large sieves or mats of loose texture, and dried under the shade of trees, or in sheds with palm-leaf covered roofs, and are then ready for the market. To dry them in the sun causes them to turn black and shrivelled, and to evaporate much of their strength. A properly dried clove is of light-brown or tan colour. The shipments of cloves from Singapore to the United States have, last year excepted, never amounted to much, and supplies were obtained chiefly from Amboyna.

Pepper Cultivation.—Black and white pepper grow on the same vine; the green pepper-berries, just before maturity, after gathering, turn black and make "black pepper," while "white pepper" is obtained by gathering the berries—fire-red in colour—when fully ripe, and through long soaking in water and subsequent stirring and shaking, relieving the berries of the outer skin; after which, on being dried, they become "white." In what country the pepper-vine originated, the writer is unable to say; but Eastern history shows that the northern half of Sumatra, the once mighty old sultanate of Acheen, when the Portuguese, Dutch and British (in rotation) came to that country, was far famed for that spice, which drew, at Acheen Busar, in North Sumatra (near the entrance of the Straits of Malacca), the native traders from many Eastern countries and islands, who there exchanged the products of their countries or purchased for cash. After the British East India Company, during the last century, acquired the island of Penang from the Rajah of Quedah, a Siamese souzerain, so favourably situated for commercial purposes, and made it a very important factory and place of residence for a sub-governor, the great Acheen trade gradually drifted to Pulo-Penang (Prince of Wales Islands), and with it the pepper trade principally. At that time Singapore had not been acquired by the British, and not before 1819, when the island was covered with a dense trackless jungle. After the acquisition of Penang the natives on the peninsula of Malacca, especially in the province of Frang, a Siamese souzerain province, commenced to plant pepper, and with excellent success; and now it is extensively planted by Malays and Chinese in many places on the peninsula of Malacca, also in Siam, Cochin-China, and in Sarawak, Borneo. That grown in the southern part of the peninsula and on the island of Singapore, known in the market as "Singapore pepper," is by far the best, commanding a higher price than Acheen pepper. Penang maintained the Acheen pepper trade until the Dutch commenced their war of conquest in Acheen in 1873, blockading the coast and preventing the exports of all Acheenese products. At that time, owing to the spread of wild rumours about the destruction of the pepper gardens in Acheen, etc., pepper reached the figure of 14 dollars per cwt., for a short time. It was feared, the supplies from Acheen being cut off, that the spice would become scarce, and as a consequence many Chinese planters increased its cultivation; in fact, to such extent that the Acheen war was no longer looked upon as the cause of influence in prices. Later some of the chiefs of certain Acheenese provinces having submitted to Dutch rule, were allowed to send pepper to Penang on vessels having a permit from the Dutch Consul in Penang to supply them with rice and other needed goods. Then it appeared that some of the Rajahs who had submitted to the Dutch, after having been pretty well supplied with the necessaries of life, turned truant again, and, as a consequence, their coasts were again blockaded. The Dutch are now making efforts to make "Ole-Seh," the old port of Acheen Busar, in fact well protected by a fort and man-of-war, a trading port, and to export "Acheen pepper from Acheen" themselves. As to the pepper-vine it presents a very handsome appearance; a pepper garden at a distance looks like a "hop-yard." Some planters, however, trellis the vine, and the writer thinks that is the best plan. It grows everywhere round about Singapore very easily and luxuriantly on fair upland soil, not liking low heavy soil, and, like the grape-vine, needs occasional pruning, weeding and fertilizing. With a little care and attention it yields abundantly and proves a good source of income. The quantity of pepper exported annually from the Malay peninsula and ports in Dutch India is simply immense, and is almost exclusively planted, gathered, and brought to market by natives, Malays and Chinamen chiefly.

Nutmegs and Mace.—Nutmegs and mace belong together, the latter being the inner covering of the nut. This most interesting, and, in its natural fresh state, lovely spice, seems to be an especial favourite with the American people, since the export thereof, of the nut especially, to the United States, exceeds that to all Europe combined. The home of the nutmeg in reality is New Guinea (Papua), where it grows wild, and it is possible that in times past (and now) the famous and daring Bugistraders, who alone obtained the most noted products, by way of barter with the extremely barbarous and hostile inhabitants, brought away certain quantities thereof. The most reliable place of production of obtaining them, agreeably with the demands of the market, has ever been the island of Banda and probably other islands, among or near the Moluccas, while the island of Penang and the Straits Settlements furnished also their quota, the quantity increasing gradually. The nutmeg thrives well, also, with a little care, on certain parts of the peninsula, and if the Colonial Government had given hitherto a little more fostering care to its cultivation, a much larger quantity might have been produced. In Deli, Sumatra, nearly opposite Penang, where the tobacco planters labour under the idea that their rich soil, after having produced one crop of tobacco will not produce a second sufficiently good to pay, and that the land must lie fallow for six years (grow up in jungle again), some of them a few years ago became happily possessed of the idea whether during those six long years the tobacco lands might not possibly produce something else "that would pay," and a few of these intelligent tropical husbandmen concluded to plant nutmegs. Six good coolies, at 20 cents wages per day each, with a hand cart, could soon plant a large piece of fallow tobacco land in nutmegs. In the meantime, the tobacco planters, who looked upon this as an experiment that would not cost them much, and paying little attention to it, went on tobacco planting, looking upon that as their object and actual source of profit, as it takes about five years until the nutmeg trees commenced to bear. Some of the planters had crops of fine nutmegs to send to market at the end of that time, in addition to all the tobacco they produced and shipped during the same period. The nutmegs being good and large could enter the market as "Penang nutmegs"—an innocent, cheap enterprise that turned out well, the nutmegs being worth about 70 dollars per picul, unselected, and mace, if slowly and neatly dried, not scorched, about from 40 dollars to 50 dollars per picul. It takes 110 fair-sized nutmegs to make one pound (1 picul = 133½ pounds at 80 dollars) worth 60 cents; and since a good full-grown nutmeg tree in full bearing can produce several bushels of nuts with the hulls on, it can be easily seen that the "experiment" turned out well. Such of the planters as had their wits about them, the price of Deli tobacco having fallen

during the last two or three years nearly 50 per cent. against former years, and yielding little or no profit at the present time, can now stop tobacco planting and find old tobacco prices in their nutmeg groves until the price of tobacco rises again. The number of the "successful," however, is not large; but will, after such a demonstration, become larger, it is supposed. The nutmeg tree will grow well on the coast of Borneo and adjacent islands, as well as in the Malayan States on the peninsula, under British and Siamese rule; and, as we have very advantageous treaties with both countries, the United States buying more nutmegs than the whole of Europe taken together, some of our enterprising young men might perhaps spend some time profitably in reflecting upon this.

ARALIA SPINOSA.*

BY JOSIAH KIRBY LILLY, PH.G.

Noticing the great differences in the results of former investigations of aralia bark, the writer performed a series of experiments, in hopes of determining the nature of the principles to which the drug owes its slightly aromatic odour, bitterish and acrid taste.

The odour of the bark proved to be due to a volatile oil, present in very minute quantity. By distilling 8 ounces of the ground drug with water a few yellowish-green globules of the oil were separated. It possessed an aromatic, somewhat camphoraceous odour, and gave with litmus an acid reaction.

On continuing the distillation, with the addition of solution of potassa, no other volatile principles were observed.

The bitter taste resides in an amorphous, extract-like mass, soluble in ether, alcohol and water, insoluble in petroleum benzin, and not precipitated by neutral or subacetate of lead. The process by which it was obtained is as follows:—The drug was exhausted with alcohol, this removed by distillation until the residue assumed the consistence of syrup; this residue was then precipitated in water, the resinous precipitate separated by filtering, and the filtrate evaporated to a soft extract, which was treated repeatedly with stronger ether. The ether solution on being allowed to evaporate spontaneously left a yellow mass, which, when dissolved in water and allowed to stand, separated crystals; the mother-water from the crystals, upon being evaporated, yielded the bitter mass already described.

It was also separated from an extract, resulting from the evaporation of a decoction, by treating it with stronger ether, and proceeding with this ether solution as with the one above.

The crystals that were separated from the bitter principle possessed a taste which was at first saline, then developing a slight astringency; they were freely soluble in ether and alcohol, less so in water, and were entirely volatilized at a red heat.

The acrid principle is a resin, which I obtained in the form of a grey powder, possessing a strong and persistently acrid taste, insoluble in ether, soluble in alcohol. It is the resin remaining after treating with stronger ether the resinous precipitate yielded by the alcoholic extract in water.

The portion of this resinous precipitate which was soluble in ether consisted of a tasteless resin and much green colouring matter, undoubtedly chlorophyll.

In distilling for volatile oil, preparing decoctions, infusions, etc., much trouble was experienced through the formation of a dense and persistent froth. Steps were taken to separate this saponaceous principle with the result of obtaining it in the form of a nearly white powder, inodorous, possessing a slightly acrid taste, freely soluble in water and dilute alcohol, almost insoluble in alcohol, and entirely insoluble in ether and chloroform. A process by which it was isolated is as follows:—The extract procured by evaporating a cold infusion was treated with stronger ether to remove the bitter principle, and the residue thoroughly washed with dilute alcohol; this solution was evaporated to an extract and dissolved in water. The aqueous solution yielded with a solution of lead acetate a scanty precipitate, which was separated by filtration. The filtrate gave with solution of subacetate of lead a copious precipitate, which was collected, well washed, the lead removed by suspending in water and passing hydrosulphuric acid through the solution, and the filtrate evaporated. The product of this evaporation proved to be this saponin-like substance; it was much improved in colour by dissolving in a small quantity of hot alcohol, from which it reprecipitated upon cooling, the alcohol holding much of the coloring matter in solution. This principle may also be obtained by exhausting the ground drug with boiling alcohol, from which it separates upon cooling. On boiling this body in a very dilute solution of hydrochloric acid it proved to be a glucoside, yielding glucose and an insoluble white substance.

To this principle I think the name "araliin" could be very properly applied. The araliin of Holden (*Am. Journ. Pharm.*, August, 1880) is described as "a yellowish substance in scale, foaming excessively upon agitation," and is very probably this substance incorporated with some foreign matter.

The alkaloid announced by Elkin (*Am. Journ. Pharm.*, August, 1880) as existing in aralia bark could not be found. No precipitates were formed when Mayer's test, or a solution of iodine in iodide of potassium, was added to an acidulated infusion or decoction, nor to the solution resulting after treating an alcoholic extract with acidulated water.

No reactions were given indicating the presence of tannin. A green colour was produced by ferric chloride, but a solution of gelatin caused no precipitate with a somewhat concentrated decoction. Glucose was indicated by Trommer's and Fehling's tests, as was starch by iodine. Milk of lime precipitated pectin from an acid decoction. Albumen was not coagulated upon boiling a cold infusion.

* From the *American Journal of Pharmacy*, September, 1882.

THE LACQUER INDUSTRY OF JAPAN

BY JOHN J. QUIN,

Her Majesty's Acting Consul at Hakodate.

(*Continued from page* 268.)

Various Kinds of Lacquer and Mixtures used.

(*a.*) *For Plain Work.*

Ki-urushi (crude lacquer) is the generic name by which all lacquer obtained from the trunks of live trees is known. It forms the basis of nearly all the various mixtures used in making lacquer ware.

Seshime (branch lacquer).—This kind is obtained from the branches of the trees, as described above; but the yield is only about 1 per cent. in comparison with other lacquer. As, however, in working the proportion of nearly 90 per cent. is required, the lacquer manufacturers sell a mixture which is stated to be a compound of true branch lacquer, the best crude lacquer, *Ura-me* and *Tomê* lacquer, *funori* (seaweed jelly), and sweet potatoes grated fine, the whole coloured, as may be necessary, with soot. The proportions in which these materials are used cannot be ascertained, and, indeed, each manufacturer uses his own special mixture, but the extraneous additions are believed not to injure the quality of the whole.

True branch lacquer becomes extremely hard when once dry, but used alone will not dry under some twenty days, so that now, when time is an object, the pure sap is but little used. Previous to the Revolution of 1868, branch lacquer of a very superior quality, and which would dry quickly, was obtained by using the young shoots

which sprouted yearly from the roots after the trees had been cut down. This kind was called *Ki-seshime* (crude branch lacquer), and was made under directions from the Government, who received it as taxes; but the practice has been discontinued of late. The price of pure branch lacquer is, owing to the difficulty in drying, only 70 per cent. of ordinary good lacquer.

Rō-urushi (black lacquer).—This is made by adding to crude or branch lacquer about 5 per cent. of the tooth-dye used by women (*Haguro*), a liquor formed by boiling iron filings in rice vinegar, and exposing it to the sun for several days, stirring the mixture frequently till it becomes a deep black.

In preparing all lacquer, from the crude lacquer to the various mixtures, the principal object is to get rid of the water that exudes from the tree with the sap. To effect this, it is exposed in broad flat wooden dishes, and stirred in the sun. This, however, alone will not cause the original water to evaporate, so from time to time—ordinarily about three times in the day—a small portion of clean water is stirred in, say 1 per cent. each time, for a couple or three days, according to the heat of the sun. All the water then evaporates together. No lacquer will dry until this process has been gone through. If the lacquer is old, *i.e.*, has been tapped a long time before using, it is much more difficult to dry. In such cases a portion of fresh lacquer is added to the old by the wholesale dealers, or else the manufacturers, instead of water, sometimes mix *saké* (rice beer) or alcohol to "quicken" it.

A very remarkable property of lacquer should be mentioned. If crude lacquer, which is originally of the colour and consistency of cream, is exposed to the sun for a few days without adding water, it loses its creamy colour, and becomes quite black, or nearly so, but also becomes thinner and transparent, or rather translucent, as can be seen when it is smeared on a white board. It will not now, however, dry if appplied to an article, even if kept a month or more in the damp press. But if water is mixed with the lacquer which has thus been exposed and become black, it at once loses the black colour and its transparency, and becomes again of a creamy colour, though slightly darker, as if some coffee had been added, than at first. After evaporating this water, it can then be used like any ordinary lacquer, either alone or in mixtures, and will dry in the damp press, during which process it again turns black. What lacquer workers have found their greatest stumbling-block is the difficulty of obtaining a clear transparent varnish. What is called transparent varnish is really black to the eye, and requires grinding and polishing after application before it presents a brilliant surface, becoming also much lighter after a little time. It would be a new era in the manufacture of lacquer ware if a method could be discovered of rendering the lacquer varnish perfectly clear and light coloured when so desired, without depriving it of its drying qualities, and also if colours could be used with it other than those hereafter mentioned.

Nakanuri-urushi (middle painting varnish).—This is merely the crude lacquer. After having been exposed for some time to the sun to darken it and to get rid of all water, it is used for under coats in making first-class lacquer ware.

Nuritate-urushi (finishing lacquer).—This is a mixture of crude lacquer and a little terpentine with *Tō-midzu* (whetstone water)—being the mixture obtained from whetstones on which blades have been sharpened. In it there is some 7 to 8 per cent. of iron, and after mixing, the whole is exposed to the sun, both for the purpose of getting rid of all the water and to darken the colour. This is used for final coats of cheap lacquer, which is not polished afterwards.

Jō-hana-urushi.—This is a mixture of the above kind. with oil obtained from the *Ye* plant (*Perilla ocymoides*), This is used for still more common kinds requiring no after polishing, and the lacquer does not present a hard surface.

Jō-chiu, called in Kioto *Chiu-hana; Jō-tame*, called in Kioto *Ge-hana.*

These contain more and more oil, and are used for the commonest articles, such as for varnishing clogs, clothes baskets, etc. These three last kinds give a high polish, but the lacquer does not last.

Shu-urushi (vermilion lacquer).—This is the best crude or transparent varnish mixed with *Ye* oil (*Perilla ocymoides*), sometimes as much as 50 per cent. being added. It is then exposed to the sun and water added, which is afterwards evaporated. This kind is only used for red (whence its name) and coloured lacquers, the colours being added at the time of application. It requires no after polishing.

(*b.*) *For Lacquering with Gold.*

Nashiji-urushi (pear basis lacquer), or *Suki-urushi* (transparent lacquer).—The first name is that best known in the trade, as indicating that it is required for using over gold, silver or tin powdering. It consists of the finest crude lacquer obtained from old trees. As stated previously, the lacquer is allowed to stand till all dirt and foreign matter has sunk to the bottom, when the best is skimmed off, and after being exposed to the sun to evaporate the water in the usual manner, and carefully filtered, it is ready for use. Except when used for the highest class of gold powdering, a certain proportion of gamboge is mixed with the lacquer to give the dust a fine yellow colour.

N.B.—The above ten kinds are all bought by the lacquer workers ready prepared from the manufacturers. Any further mixtures used by them are made as required, colours added, etc.

Seshime-urushi (branch lacquer) and *Rō-urushi* are used also in making gold lacquer.

Yoshino-urushi.—This is crude lacquer from the district of Yoshino in the Province of Yamato. It dries quickly, and closely resembles transparent varnish. It is used when giving the final coats before polishing.

Yoshino-nobe-urushi (Yoshino spreading lacquer).—Same as above, with the addition of about one-third of camphor to render the lacquer thinner and more easy to spread.

Seshime-nobe-urushi (spreading branch lacquer).—This is merely branch lacquer with the same proportion of camphor as above; when cheap work is required more camphor is used till the proportions are reversed. This renders the mixture very soft, and a small quantity can be spread over a large surface.

Shita-maki-urushi (under coat lacquer).—A mixture of branch lacquer and *Benigara* (red oxide of iron) in equal parts by weight.

Ke-uchi-urushi (inside line lacquer).—This is the same as above, but it is allowed to stand for about six months after mixing before it is used. By this time it has got thicker, and the very finest lines can be drawn without fear of their running, and they moreover stand out better.

Shita-maki-nobe-urushi (under coat spreading lacquer). —Same composition as above, with the addition of a little camphor to make the lacquer thin. It thus goes much farther, and causes a great saving when lacquering with powdered gold-leaf (*keshi-fun*), for which it is best suited. As in the other mixtures, the more camphor is used the thinner it renders the lacquer, and less gold is required.

Taka-maki-urushi (raised lacquer).—To make this a certain quantity of *Rō* or *Nuritate* is taken and divided into three parts. To one part is added lampblack and camphor in equal portions of bulk. These, after being well mixed, are boiled together; then the other two portions are added, and the whole stirred together, and afterwards filtered through paper. It is boiled more or less according to the season. In summer when lacquer dries quickly, it is boiled for a longer period, while in winter, or during cold weather, when lacquer naturally takes longer to dry, the mixture is boiled for a shorter time. The reason

why *Takamaki* is thus purposely rendered soft is explained by the fact that otherwise the upper surface would harden at once, while the under portion (*Takamaki* being applied thickly) being excluded from the upper air, would not be able to dry, and later the top surface would crack and show fissures, whereas the introduction of camphor renders it soft and much slower to dry, and the whole has thus time to harden equally. Camphor being volatile is gradually lost, and the composition becomes quite hard.

Ro-se-urushi (a mixture of black and branch lacquer).—This is used for the lacquer coating upon which gold, silver, or tin powder is scattered, except in such cases when the grain of the wood is to be shown, when *nashiji* lacquer is used instead.

Kuma-urushi (shading lacquer).—A mixture of *Johana* lacquer and lampblack, used for final shading in the feathers of birds or animals, or for drawing hair, etc., on flat and raised gold lacquer.

It should be noted that whenever lampblack is mentioned as a mixture it is used for the superior kinds, wood or coal soot being used for inferior articles.

Implements and Materials used in the Manufacture of Plain Lacquered Ware.

Hera.—A spatula made of *Hinoki* (*Chamæcyparis obtusa*), used for applying the under or priming coats and for mixing the lacquer.

Haké.—A flat brush made from human hair, used for laying on the lacquer.

Kokuso.—Finely chopped hemp. Mixed with lacquer it is used for covering joints.

Nuno.—Hempen cloth, used for pasting over the wood to prevent it splitting and to strengthen corners, etc. For very fine work and small articles silk is used.

Ji-no-ko (burnt clay).—Afterwards reduced to a very fine powder. Pounded bricks are often used.

To-no-ko.—A fine kind of clay, which is procured from Mount Mari, near Kioto. This is likewise burnt, and reduced to a fine powder.

Sumi.—Charcoal made of *Hōnoki* (*Magnolia hypoleuca*), used for smoothing down the under coats; it has rather a rough grain. Also charcoal made from *Hiyakujikkō* (*Lagerstrœmia indica*). This is very soft and of a fine grain, and is used for the final smoothing before hand polishing. This kind is called by the trade *Rō-iro-sumi* (black coloured charcoal).

To-ishi.—Whetstones of four different qualities of fineness: *Ara-to* (rough), *shiro-to* (white), *awo-to* (green), and *nagura*, the last being the finest. These are used for smoothing down the priming coats.

Tsuno-ko (horn powder).—This is made of calcined deer's-horns, reduced to a fine powder, and is used for the final polishing with the finger.

To-kusa (*Equisetum*).—A kind of scouring rush, used for smoothing the lacquer.

Kaki-no-shibu (Persimmon juice).—This is used when no ground lacquer is required, as in the Aidzu lacquer, or when the grain of the wood is shown.

Nikawa (glue).—This is used to mix with the groundwork for cheap kinds of ware, instead of lacquer.

Yuyen-sumi (lampblack).—Used for groundwork of cheap articles, mixed with Persimmon juice. For still more common ware, soot of any kind is used.

Gofun (whiting).—Made from burning old shells, such as are obtained from the ancient kitchen middens; used for mixing with glue to make the groundwork of common lacquer.

Shō-no (camphor).—Used for mixing with lacquer, to make it thinner and spread more easily.

Hōchō (knife).—Used for scraping off all inequalities of the hempen cloth after it is pasted on the article, etc.

Yoshino-gami.—A very thin kind of paper, made at at Yoshino; used for filtering the lacquer before using it.

Jō-ban.—A box with a very hard lacquered lid, usually containing drawers for the various pencils, etc. The lid is used for mixing the lacquer on while working.

Tsuno-ko-ban.—Board for mixing and powdering the deer's horn ashes before using: generally made of cherry wood or oak.

Muro.—A cave or cellar underground is used, where practicable; otherwise, an air-tight case, made of wood, with rough unplaned planks inside. These are thoroughly wetted before the lacquered article is put in to dry, which occupies a period varying from six to fifty hours, according to the time of the year or style of the lacquer. Lacquer will not dry or harden properly in the open air; it absolutely requires a damp closed atmosphere to do so, otherwise it would run and always remain sticky.

The following are mixtures made by the workman as required:—

Kokuso.—A mixture of finely chopped hemp, with rice starch and branch lacquer sufficient to make a thick paste.

Jino-ko (No. 1).—Powdered burnt clay and branch lacquer, mixed together in the proportion of 1 part of clay to 2 parts of lacquer.

Jino-ko (No. 2).—The same, mixed in the proportion of 10 parts of clay to 13 of lacquer, and a little water.

Jino-ko (No. 3).—The same, mixed in the proportion of 10 parts of clay to 8 parts of lacquer and 2 parts of thin rice starch. This mixture is known in the trade as *Han-dan-ji* (half-step basis).

Jino-ko (No. 4).—The burnt clay powder mixed with liquid glue only in such proportions as will resemble the consistency of lacquer.

Kiri-ko.—A mixture of *Jino-ko* and *Tōno-ko* in equal portions with 1½ of branch lacquer. This becomes very hard.

Sabi.—A mixture of 2 parts of the burnt clay from Mount Mari to 1½ of branch lacquer, with just sufficient water to mix the clay into a paste.

An inferior class of *Sabi* is made by putting in less lacquer—as little as 8 parts of lacquer being used to 20 parts of the clay. Less lacquer cannot be used, as it would not stand polishing after having been dried.

Mugi-urushi.—Wheat lacquer; being a portion of wheaten flour mixed with branch lacquer to such consistency as may be required. It is used to paste the hempen cloth on to the wood.

Shin.—A mixture of rice flour with branch lacquer, used for the same purpose as wheat lacquer. Wheaten flour is the best, but being more difficult to blend with lacquer it is not so much used.

Ka-no-ji.—A mixture of whiting and liquid glue, used for under coats or cheap articles.

Shibu-ji.—A mixture of lampblack and Persimmon juice, used for under coats in inferior ware.

The following are the modes of applying the lacquer:

(*a.*) *Honji* (real basis). The article to be lacquered is first carefully smoothed, and the wood is slightly hollowed away along each joint, so as to form a circular depression. The surface of the whole article is then given a coating of branch lacquer (this is called *Ki-ji-gatame*—hardening the wooden basis), and the article set to dry in the damp press, or *Muro*, for about twelve hours. The hollowed portions are filled with prepared *Kokuso*, which is well rubbed in with a spatula made of the wood of the *Chamæcyparis obtusa*, and the article is enclosed in the drying press for a period of at least forty hours. Over the *Kokuso* a coating of *Sabi* is applied, and set to dry for twelve hours. The next process is to smooth off with a white whetstone any roughness or inequalities of the *Kokuso* and *Sabi*. The article is then given a coating of wheaten lacquer, over which is stretched hempen cloth, great care being taken to spread it smoothly and leave no wrinkles or perceptible joinings, and it is then again enclosed in the drying press for about twenty-four hours. After taking the article out of the press all inequalities in the cloth—which has now under the influence of the lacquer become harder than wood—are

smoothed down with a knife or with a plane. Next, a coating of *Sabi* is applied with the spatula, to hide the texture of the hempen cloth, and the article is again put in the press for twenty-four hours. Next, a coating is given of No. 1, *Jino-ko*, applied with the spatula, after which the article is enclosed in the drying press for twenty-four hours, and this process repeated. Next, the article is given a coating of *Kiriko*, likewise applied with the spatula, and the drying process is repeated for twenty-four hours; there is then a repetition of the same process, after which the article is set to dry for at least three days. The surface is next ground smooth with a fine white whetstone, and a hardening coat of branch lacquer is given with a spatula, and set to dry for twenty-four hours. A fresh coat of *Sabi* is applied with the spatula, and the article is put to dry in the press for twenty-four hours. When thoroughly hardened the surface is ground smooth with a white whetstone, as before. Next, a thin coating of branch laquer is applied with the spatula, and the article is set to dry in the press for twelve hours. A coating of *Naka-nuri* is then applied with a flat brush (*Hakê*), and the article set to dry again for twenty-four hours. On being taken out the surface is ground smooth with charcoal made from *Hōnoki* (*Magnolia hypoleuca*). A thin coating of branch lacquer is given with cotton wool—old wool being chosen because less likely to leave hairs behind it—and rubbed off again with soft paper, after which the article is set to dry for twelve hours. A coating of *Rō* (black lacquer) is then applied, and the article is set to dry for twenty-four hours. The surface is rubbed smooth with a piece of charcoal made from *Hiyakujikko* (*Lagerstrœmia indica*). The surface is partly polished with finely-powdered *Lagerstrœmia* charcoal, applied with a cotton cloth. A coating of *Rō* is applied very thinly with cotton wool, and this is rubbed off again with soft paper, after which the article is enclosed in the drying press for twenty-four hours. The surface is now polished with an equal mixture of powdered burnt clay from Mount Mari (*To-no-ko*) and calcined deer's-horn ashes, applied with a cotton cloth and a little oil (made from *Sesamum orientale*), till a fine polish is obtained. A coating of branch lacquer is next given, applied with cotton wool very thinly, and the article is enclosed in the drying press for twelve hours. The workman dips his finger in oil and rubs a small quantity of it over the surface, which he then polishes with deer's-horn ashes, applied with a cotton cloth, till a bright surface is obtained. A coating of branch lacquer is applied thinly with cotton wool, wiped off with soft paper, and set to dry for twelve hours. Oil is again applied, and then a final polishing with deer's-horn ashes given with the finger to the surface, which now assumes the most brilliant polish of which it is capable.

For articles that are liable to get rubbed, such as scabbards, these last two processes are repeated seven or eight times, the surface getting harder at each repetition, but this is not necessary for other articles even of the best quality. In describing the above processes the *minimum* time for drying has in each case been given, but for the first twenty-five processes the longer the article is kept in the press the better. From the twenty-eighth process to the finish it is better not to greatly exceed the times mentioned.

(*b.*) *Kata-ji* (hard basis); (*c.*) *Handan-ji* (half-step basis); and (*d.*) *Manzo* (after a lacquer worker of that name), modifications of the first process.

(*e.*) *Ka-no-ji* (inferior basis). In this class the joints of the article to be lacquered are frequently not hollowed away, a strip of paper being merely pasted over them, and even this precaution being often omitted. A coating of *Ka-no-ji* (whiting and glue) is applied with a spatula twice or thrice, and dried in the sun. The article is then wiped over with a wet brush and rubbed smooth with a white whetstone, and afterwards given an extra smoothing with the spatula. Sometimes a thin coating of *Nakanuri* or of branch lacquer is given to the article, but more frequently a coating of glue and lampblack, or of glue and soot mixed together, is applied. A final coating of either *Jō-hana* or *Jōchiu* finishes the process without any subsequent polishing.

(*f.*) *Shibu-ji* (*Persimmon*)—(juice basis). The joints of the article are prepared in the same manner as for (*e*), but, instead of *Ka-no-ji*, four or fivecoats of *Shibu-ji* (Persimmon juice and lampblack) are applied with a brush; these dry very rapidly and the last coating is smoothed with *To-kusa* (*Equisetum*). A final coating of either *Jō-hana* or *Jō-chiu* is given. This kind of article is chiefly made in Aidzu, and, indeed, goes by the name of "Aidzu Ware." It has not such a good appearance as *Ka-no-ji*, for the grain of the wood is easily traceable under the lacquer, but being made without glue, it stands water much better, and is in general request for rice bowls and *zen* (small dinner trays with legs, one of which is set before each guest).

(*g.*) *Sabi-Sabi* (double Sabi). In this class of goods the joints are generally hollowed out, and a basis-hardening coat of branch lacquer given. Paper is also pasted over the work after filling in the joints with *Koku-so*. Three coats of inferior *Sabi* are then applied, and after drying for about twelve hours in the press, the article is ground smooth with a white whetstone. Next comes a coating of branch lacquer, applied with cotton wool, and then one of *Nakanuri*, which is ground smooth with *Magnolia* charcoal. Another coating of branch lacquer is followed by one of *Jō-hana* or *Jō-chiu*, and the article is finished without further polishing. Drying in the damp press is requisite between each process for this class of lacquer. It is manufactured only in Tôkiô, though the processes for the under coats of *Wakasa* lacquer are identical. Rice bowels, drinking cups, and luncheon boxes, etc., are the usual articles manufactured. In this, as in Aidzu ware, the grain of the wood is traceable, and its common appearance constitutes the reason for classing it so low, but in actual excellence and durability it ought to rank fourth next to *Handan-ji*.

(*h.*) *Kaki-awase* (mixture), or *Kuro-shunkei* (black Shunkei), from the name of its inventors. In this class of goods the wood is given a basis-hardening coat of branch lacquer mixed with lamblack, over which is laid a final single application of *Jō-hana* or *Jō-chiu*. This ware is made at Tôkiô, and is used for cheap rice bowls and boxes. For the commonest kind of work a mixture of glue and lampblack or Persimmon juice and lampblack is used, instead of branch lacquer, as a ground coat.

(*i.*) *Aka-shunkei* (red Shunkei).—This kind also derives its name from the inventor. For making articles of this class, which show the natural grain of the wood, a mixture of *Yoshino* lacquer and gamboge is rubbed on with a hard brush, after which they are inclosed for a day in the press to dry, and then a coating of *Shu-urushi* (transparent lacquer, containing a proportion of *Perilla ocymoides* oil) is applied. When dry it presents a polished surface, and it appears dark when at first finished, but in a few months becomes much lighter. A cheaper quality of *Shunkei* is made by using glue and gamboge or Persimmon juice and oxide of iron for the under coat, but though the colour has a better appearance at first, it gradually deteriorates. The best is made in the Province of Dewa, at Akita. For the most part soft woods are used in making this ware.

(*j.*) *Ki-ji-ro* (colour of the grain of wood). Well seasoned wood is selected, and the article having been carefully smoothed, a thin coating of *Yoshino* lacquer is applied with a brush, after which it is set to dry in the press for twelve hours. A coating of best *Sabi* is then applied with the spatula, and set to dry in the press as usual. This is ground completely away with a green whetstone. A coating of *Nashiji* (pure transparent lacquer) is now given, and the article is inclosed in the press for twenty-four hours. It is again ground with a green whetstone till no remains of the lacquer coating are apparent. Then follows a second coat of transparent

lacquer, which, after drying as before, is ground smooth with a piece of *Hiyakujikko* (*Lagerstrœmia indica*) charcoal. Transparent lacquer is again applied with a piece of cotton wool, and wiped off with soft paper, and the article is set to dry for twelve hours. Afterwards it is given a primary polish with an equal mixture of *To-no-ko* and deer's-horn ashes applied with a cotton cloth and a little oil. Next, a coating of *Yoshino* lacquer is applied with cotton wool, wiped off with paper, and set to dry as before. At this stage only deer's-horn ashes, with a trifle of oil, are used for polishing. This process is repeated three times, and results in an exceedingly brilliant polish. Only hard woods are used for this kind of ware,

(*k.*) *Red and Coloured Lacquers.* For making best red and other coloured lacquers the first twenty-two processes are the same as in *Honji* (*a*). Next a mixture of *Nashiji* (pure transparent lacquer) and vermilion, or the colour desired, is given to the article, which is thereupon set to dry. The remainder of the processes are identical with (*a*), except that *Yoshino* lacquer is substituted for "branch lacquer," and transparent varnish is used instead of *Rō* (black lacquer). For extra high-class work, instead of the thin coating of lacquer which is wiped off again, a thick coating of transparent varnish is given, applied with a brush, and set to dry for about thirty-five hours, the remaining processes remaining unchanged. For second-rate articles the colour is mixed with *Shu-urushi* (transparent lacquer containing oil), and no after polishing takes place. The article presents a brilliant surface, and the colour is better and brighter than in the best kind, but the surface much less hard. Many processes are omitted for cheaper articles, as is the case in black lacquer, and less lacquer and more oil is used.

(*To be continued.*)

SELECTIONS FROM THE NON-OFFICIAL FORMULARY OF THE DUTCH SOCIETY FOR THE ADVANCEMENT OF PHARMACY.*

(*Continued from page* 186.)

TINCTURA KAMALÆ (*Tincture of Kamala*).

Kamala	3
Stronger alcohol	8

Macerate during three days, and filter.

TINCTURA GUARANÆ (*Tincture of Guarana*).

Extract of guarana	1
Alcohol	16

Dissolve the extract in the alcohol, and, if necessary, filter.

EXTRACTUM GUARANÆ (*Extract of Guarana*).

Guarana	1
Stronger alcohol	3
Water	q.s.

Mix the guarana with 2 parts of the alcohol and 3 parts of water, and let it stand three days, occasionally shaking. Then express and treat the residue with a mixture of 1 part of the alcohol and 2 parts of water. Let stand during one day, express, unite, and filter the strained liquids, and evaporate them, on a water-bath, to a thick extract.

TINCTURA PUCHURY (*Tincture of Puchury*).

Puchury beans (from *Nectandra Puchury*, Nees), in coarse powder	1
Stronger alcohol	8

Macerate during seven days, express and filter.

TINCTURA PYRETHRI COMPOSITA (*Compound Tincture of Pellitory*).

Walker's Toothache Tincture.

(Commonly called, in Dutch, "woordhoulder" = "word-keeper.")

Pellitory root (*Anacyclus Pyrethrum*), finely cut	1
Guaiac resin, in powder	4
Stronger alcohol	24

Macerate during seven days, express and filter.

* From *New Remedies*, August, 1882.

TRIMETHYLAMINA (*Trimethylamine*).

(Propylamine, improperly so called.)

A liquid obtained from herring-brine [or, more abundantly, from beet-root molasses.—ED. N. R.], containing 20 per cent. of pure trimethylamine. It is a clear, colourless liquid, of an alkaline reaction, the specific gravity 1·124, and having a peculiar odour, recalling that of ammonia and herring-brine. It is miscible with water and alcohol in all proportions.

One part of hydrochloric acid of specific gravity 1·170 should neutralize 3 parts of trimethylamine. The salt, obtained by evaporating this solution, should be completely soluble in absolute alcohol.

TROCHISCI IODOFORMI (*Troches of Iodoform*).

	Grams.
Iodoform	50
Sugar, in powder	1000
Oil of peppermint	1·5
Tragacanth, powdered	2·5
Glycerin	10
Water	q.s.

Mix the first four ingredients with the glycerin and enough water to form a mass, and divide this into 1000 troches.

Each troche contains 0·05 gm. or nearly ¾ of a grain of iodoform.

TROCHISCI CETRARIÆ (*Troches of Iceland Moss*).

Iceland moss sugar (see vol. xii., p. 827)	q.s.
Orange-flower water	q.s.

Make troches, weighing 1 gm. (15½ grains) each. Dry them, and keep them in a stopped bottle.

UNGUENTUM LENIENS (*Cold Cream*).

(Unguentum Aquæ Rosæ.)

Olive oil	360
White wax	36
Spermaceti	60
Rose water	120
Tincture of benzoin	24
Oil of rose	1

Melt the first three ingredients together on a water-bath, allow the mixture to become nearly cold, then add to it, under constant stirring, the other three ingredients.

UNGUENTUM ARGENTI NITRATIS COMPOSITUM (*Compound Nitrate of Silver Ointment*).

(Unguentum Nigrum.)

Nitrate of silver	1
Oxide of zinc	3
Balsam of Peru	3
Lard (unsalted)	24

Dissolve the nitrate of silver in a few drops of distilled water and mix the solution with 12 parts of suet. Then, having mixed the oxide of zinc with the remainder of the suet, incorporate it with the first prepared mixture, and finally add the balsam of Peru.

UNGUENTUM OPHTHALMICUM COMPOSITUM (*St. Yves' Compound Eye Salve*).

Red oxide of mercury	15
Oxide of zinc	6
Camphor	5
Oil of almonds	10
Lard	140
Yellow wax	24

Mix the oxides and the camphor intimately with the oil of almonds, then incorporate with the lard and wax previously melted together and allowed to cool.

VASELINUM (*Vaseline*).

Vaseline is a product obtained from the residue left after the distillation of petroleum.

American Vaseline is a semi-transparent, orange-yellow, odourless and tasteless mass, melting at 32°–33° C. (89·6°–91·4° F.), and having the spec. grav. 0·860. It is insoluble in water, very little soluble in cold or boiling alcohol, but is easily soluble in ether, chloroform, benzol, fixed or volatile oils.

When heated in an atmosphere of oxygen, it absorbs

much of this gas, acquiring a sharp odour, and yielding, when dissolved in ether, a solution having an acid reaction.

Austrian Vaseline is almost identical, in properties, with American vaseline.

Virginia Vaseline is a greenish-yellow, odourless and tasteless mass, melting at 40°–41° C. (104°–105·8° F.), having the spec. grav. 0·900, and a denser consistence than American vaseline. Towards ether, water, benzol, etc., it behaves like the American. In strong alcohol it is somewhat more soluble.

This variety of vaseline absorbs but little oxygen, when heated in an atmosphere of the gas. Its odour is scarcely affected thereby, and if shaken, after cooling, with ether, it yields a liquid of not more than a faintly acid reaction.

VINUM AMARUM ALKALISATUM (*Alkaline Bitter Wine*).

(Elixir Aurantiorum Compositum.)

Tincture of orange peel (1 of orange p. and 6 alcohol	2
Carbonate of potassium	1
Sherry wine	46
Extract of gentian	1
„ centaury (lesser)	1
„ wormwood	1
„ Carduus Benedictus	1

Dissolve the carbonate of potassium in the sherry wine; add the extracts, and let the mixture stand for one day, occasionally agitating. Finally add the tincture of orange peel.

VINUM AMARUM CUM SPIRITU (*Bitter Wine with Alcohol*).

Gentian, finely cut	4
Red bark (Indian or Javanese), in coarse powder	8
Orange peel, deprived of the white layer, and finely cut	1
Canella, in coarse powder	1
Alcohol	30
Sherry wine	200

Macerate the solids with the alcohol for twenty-four hours, then add the sherry, macerate for four days, strain, express, and filter.

VINUM CAMPHORATUM (*Camphor Wine*).

Camphor, in powder	1
Acacia, in powder	1
White wine	44
Stronger alcohol	4

Mix them. It forms a white, turbid liquid.

VINUM CINCHONÆ (*Wine of Cinchona*).

(Laroche's Cinchona Wine.)

Red bark (Javanese or Indian) containing at least 6 per cent. of alkaloid, and powdered	1
Stronger alcohol	4
Sherry wine	20
Sugar	16
Water	q.s.

Macerate the red bark with twenty parts of water, for half an hour, then strain, transfer the residue to a displacement apparatus, and pour upon it the sherry wine. Allow the percolate to pass slowly, and, when the wine has disappeared from the surface, follow it by a mixture of four parts of stronger alcohol and six parts of water. Finally percolate with water until the volume of the whole liquid amounts to fifty parts. Let this stand for a few weeks until it has completely settled, then dissolve in it the sugar, and filter.

VINUM CINCHONÆ FERRATUM (*Wine of Cinchona and Iron*).

(Laroche's Ferrated Wine of Iron.)

Pyrophosphate of iron (soluble)	2
Citric acid	1
Water	3
Wine of cinchona	200

Dissolve the pyrophosphate of iron and the citric acid in the water, add the wine of cinchona, and filter, if necessary.

VINUM QUINETI (*Wine of Quinetum*).

Quinetum	1
Stronger alcohol	20
Sherry wine	180

Dissolve the quinetum in the alcohol and add the wine.

VINUM PEPSINI (*Wine of Pepsin*).

Mucuous membrane of the stomach of the hog (or of the fourth stomach of the calf or ox) scraped off with a bone knife	20
Glycerin	10
Water	10
White wine	200
Hydrochloric acid	1

Mix the mucous membrane with the glycerin and water, and then add the wine and acid. Shake the mixture well, macerate it for three days at 20° C. (68° F.), occasionally shaking, and filter.

The product should be clear, of a yellowish colour, and should have a vinous, slightly acid taste.

Ten grams of the wine, when mixed with 10 gm. of distilled water and 24 drops of diluted hydrochloric acid, should dissolve 3·5 gm. of egg-albumen (coagulated at 80°–90° C. = 176°–194° F.), after being digested with it for ten hours at a temperature of 30° to 40° C. (86°–104° F.).

MORAVIAN RHUBARB.*

The culture of *Rheum compactum* in Moravia was commenced, in the beginning of the present century, by Prikryl, apothecary in Austerlitz. Until about twenty-five or thirty years ago the root was largely exported to Lyons and Milan, where it was used for dyeing silk. With the use of chemicals for dyeing, the price of this rhubarb receded to about 10 florins per hundredweight, but more recently has advanced again, and is about 1 florin per pound for triennial roots. This rhubarb is again largely exported, chiefly to Russia, whence it is exported again as Asiatic rhubarb. Professor Dr. A. Vogl has pointed out histological differences by which this article may be distinguished from Chinese rhubarb; but a correspondent insists that even in this respect it will resemble the latter much more closely if permitted to remain in the ground for five or six years. The commercial article is said to yield extracts, tinctures and infusions, which, not only in colour, odour and taste, but likewise in activity, compare favourably with the corresponding preparations of Chinese rhubarb. The author urges the employment of this rhubarb, partly for patriotic reasons as far as Austria-Hungary is concerned, but chiefly on account of its low price and its good effects, these being fully secured if 5 parts of Moravian rhubarb be used in place of 4 parts of the Chinese root, as was pointed out already, in 1808, by Trommsdorff.

CHLORODYNE.†

Dr. John H. Gilman, of Lowell, Mass., gives the following formula for chlorodyne, in which the ingredients are so combined as to form a perfect solution, and which can be diluted with 10 parts of water without separation.

Chloroform	fl. oz.	2
Ether (stronger)	„	½
Alcohol ("95" per cent.)	„	8
Oil of peppermint	min.	24
Tincture of capsicum	fl. dr.	6
„ cardam., comp.	fl. oz.	2
Fl. ext. of licorice root	„	2
Diluted hydrocyanic acid	„	1
Glycerin	„	16
Sulphate of morphia	grains	40

Mix in the order quoted, and shake until dissolved. Dose: 10 to 30 drops.

* From the *Phar. Post*, June 16, 1882, p. 206—209. Reprinted from the *American Journal of Pharmacy*, September, 1882.

† From *New Remedies*, September, 1882.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 14, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

FREDERICK WÖHLER.

ON the last Wednesday in September there passed away at Göttingen, in his eighty-third year, one of the most illustrious chemists that the present century has yet seen, and one who in the length of his life seemed almost to form a connecting link with a time when the science of chemistry was, comparatively speaking, still in swaddling clothes. FREDERICK WÖHLER was born in the year 1800 in Frankfort-on-the-Maine. He first studied medicine and chemistry at Marburg and afterwards at Heidelberg, where upon the advice of GMELIN he gave up the idea of practising medicine and decided to devote himself to chemistry. In 1823 he went to Stockholm and became a pupil of BERZELIUS. Famous as was the master, WÖHLER was at that time his only scholar. As to the school, two common rooms with some simple accommodation, though without furnace, ventilation or water supply, constituted a not very pretentious laboratory; but WÖHLER had been preceded there by such men as MITSCHERLICH and HENRY and GUSTAVUS ROSE and was followed by MAGNUS. One long pine bench for the master and another for the pupil; some cases against the wall to hold reagents; a mercury trough, a glass-blowing table, a sink, and a pail used in common by the household servant, constituted the furniture of one room, and the balances and other apparatus that of the other, whilst the sand-bath was found in the kitchen. Such were the surroundings where the Swedish chemist did most of his famous work and where his German pupil learned to follow in his footsteps. Late in life WÖHLER loved to recall the memories of his earlier years, and some other interesting autobiographical details of his connection with BERZELIUS have already appeared in this Journal.*

In the first few years after WÖHLER'S return to Germany he obtained some minor posts; but in the year 1836 he succeeded STROMEYER as Professor of Chemistry in the University of Göttingen and Director of the Chemical Institute; and he was also appointed inspector-general of pharmacies in the Kingdom of Hanover. His university appointments he retained until his death; the inspectorship he eventually resigned, Dr. WIGGERS being chosen as his successor. But of greater importance even than his professorial work were the numerous memoirs, reporting the results of most important and diverse researches, with which he enriched chemical literature. No less than two hundred and sixty-eight communications of which he was the sole author are enumerated in the Royal Society's Catalogue, besides thirty or forty written in conjunction with such men as JUSTUS VON LIEBIG, HENRI STE.-CLAIRE DEVILLE and others. His first paper appeared in 1821 and was upon the occurrence of selenium in oil of vitriol prepared from a Bohemian mineral. Other papers followed pretty quickly, and in 1827 he announced that he had succeeded in isolating the metal aluminum by igniting the chloride in the presence of potassium. For thirty years this work appeared without adequate result, and it was DEVILLE'S successful researches upon the preparation of sodium and aluminum that first brought this metal within the reach of the manufacturer. M. DUMAS, at a recent meeting of the Academy of Sciences, speaking of the joint work of WÖHLER and DEVILLE, said, "United by a rivalry that would have caused division between less elevated minds, these two great chemists pursued in common their researches in mineral chemistry, utilized their respective labours to elucidate points still obscure in the history of boron, silicium and the platinum metals, and remained closely bound in a friendship which increased every year." WÖHLER'S early connection with BERZELIUS would appear to have influenced the direction of his work to a considerable extent, as is shown by his numerous papers on the isolation of elemental bodies —such as aluminum, glucinium, tungsten, boron, iridium, osmium, silicium, vanadium, etc.—and on various points of mineralogical chemistry.

But, perhaps, WÖHLER'S most famous communication was that upon the artificial formation of urea, published in 1828, in which he took up the position of pioneer in the synthesis of organic compounds. Before that time the apparently distinctive peculiarity of the compounds found in or eliminated from animal or vegetable organisms had given rise to the idea that their formation was due to some special agency, to which the term "vital force" was applied, and the chemistry of organic compounds was treated as a branch of chemical science distinct from the chemistry of inorganic compounds. But the discovery by WÖHLER, that the highly nitrogenous body, urea, could be produced by the molecular rearrangement of cyanate of ammonium made the first breach in this wall of partition, and when FOWNES subsequently showed that cyanogen could be formed by the direct combination of its elements, the steps in the passage from the simple inorganic substance to the "organic" compound were complete. Since that time many other compounds occurring in animal and plant organisms have been formed synthetically, but in the words of a competent judge, M. DUMAS, "la formation artificielle

* *Pharmaceutical Journal*, [3], vi., 65.

de l'urée reste encore l'exemple le plus net et le plus élégant de ce genre de créations."

Mention might be made of WÖHLER'S researches in conjunction with LIEBIG on the benzoic compounds and on the derivatives of uric acid, as well as a number of papers on essential oils; but it would be evidently impossible to attempt in these columns to analyse the subjects of all his memoirs, and enough has been said to give some indication of their importance. Before concluding, however, a few words must be devoted to another phase of his literary and scientific work. Many of his memoirs first saw the light in the famous *Annalen der Chemie und Pharmacie*, and of that journal he was one of the principal editors from the year 1838 until the time of his death. He was also the author of several larger works, such as 'Elements of Organic Chemistry' (1831), 'Examples in Mineral Analysis' (1840), and 'Practical Exercises in Chemical Analysis' (1853), and was co-editor of the 'Handworterbuch der Chemie.'

Notwithstanding his great age, Dr. WÖHLER appears to have taken outdoor exercise within a week of his death, his final illness only lasting four days.

A DENTISTS' BILL FOR VICTORIA.

A BILL for the regulation of the practice of dentistry in Victoria has been introduced into the colonial legislature. Like the British Act it is based upon the reservation of the title of "dentist" to registered persons; but although providing for the registration of persons who have practised dentistry for three years continuously immediately before its passing it contains no provision for the registration of those who have *bonâ fide* practised it "in conjunction with the practice of medicine, surgery and pharmacy," similar to that which was introduced into the British Act at the instance of the Council of the Pharmaceutical Society and has been found so useful. The Victoria pharmacists are, however, alive to the importance of the omission.

A LARGE DOSE OF EXTRACT OF MALE FERN.

THE *Ceylon Observer* reports an interesting case in which a death, following the administration of an unusually large dose of liquid extract of male fern, has been the subject of a magisterial inquiry. It appears that the deceased had been for some time under treatment for tape worm, and had urged his medical adviser to relieve him as quickly as possible, so as not to interfere with his business arrangements. The prescription given, which appears in the exhibits of the case, was as follows :—

℞	Ext. Æth. Filic. Mas.	1½ oz.
	Pulv. Kamalæ	3 drms.
	Pulv. Granati Rad.	3 drms.
	Mucil. Acac.,	
	Syrup. Simp.	q. s.
	Aquæ Cinnam. . . . . ad	4 oz.
Fl.	Half to be taken at bedtime and half at 2 a.m.	

The dispenser left out the pomegranate root, signifying that he done so to the prescriber. After taking the first dose the patient was so distressed that he sent to the prescriber to know whether he should take the remainder and received an answer in the affirmative. He did so and the worm was expelled, but the patient became worse with vomiting and purging and died in a few hours. A certificate of death from choleraic diarrhœa was given; but in consequence of the circumstances a *post-mortem* examination of the body was made, and as a result the doctor was charged with "homicide by imprudence." The prescription as actually dispensed closely resembles one attributed in NAPHEY'S 'Medical Therapeutics' (6th edit., p. 331) to the late Dr. WILLIAM BRINTON, who it is there said, "believes this superior to all other combinations for the ejection of teniæ." The dose of male fern ordered is precisely the same in both cases, but in the book it is possibly a misprint for 1½ drachms. This fact was mentioned during the inquiry and eventually the charge was dismissed.

GLUCOSE MANUFACTURE IN THE UNITED STATES.

THE manufacture and consumption of glucose in the United States is assuming enormous proportions. According to Mr. Consul-General ARCHIBALD, the present production is estimated at not less than ten thousand tons daily. The product is chiefly used by brewers, but it is also largely used as a substitute for cane sugar in the manufacture of confectionery and the mixing of syrups. A product known under the name of "new process" sugar is said to be coming into increasing demand; it contains 20 per cent. of glucose, and is with difficulty distinguished from genuine cane sugar, for which it is probably sold to a considerable extent.

"CAUTIONS TO CHEMISTS."

UNDER the above heading we continually receive communications which have for their subject the victimization of the writers by more or less plausible impostors. In some of these the statements are so diffuse and vague that it is difficult to gather what is the exact ground of the complaints, whilst on the other hand in some the indications are so precise that it would be unwise to undertake the responsibility of publishing them without a fuller acquaintance with the facts, especially as in these cases the writers generally desire to retain their anonymity. Whilst willing to render all reasonable service to the trade, we think it will be seen that it is undesirable, except in extreme cases, for us to undertake the task of publishing such statements, and the more so because as a rule immunity from impositions can, after all, be only secured by the exercise of a proper amount of carefulness in dealing with strangers.

Pharmaceutical Society of Ireland.

ANNUAL MEETING.

The seventh annual meeting of this Society was held in the College of Physicians, Dublin, on Monday, October 2, at 4 o'clock.

The chair was taken by the President, Professor R. C. Tichborne, Ph.D.

The other members of the Society present were:—Dr. Aquilla Smith, Vice-President; Messrs. Allen, Brunker, Dr. Collins, Messrs. Doran, Grindley, Hayes, Hodgson, Holmes, Dr. Montgomery, Sir George Owens, Messrs. Simpson, Wells, Batt, Bernard, Beggs, Whitby, and McIlwaine.

The first business was the election of seven members of Council to replace the outgoing seven. Messrs. Doran, Batt, and Beggs were appointed scrutineers of the voting papers.

The President said while they were waiting for the report of the scrutineers he would say a few words as to the progress of the Society. They might congratulate themselves on having, generally speaking, a quiet and steady success. On January 1, 1881, they had 187 licentiates. On January 1, 1882, they had 201, being an increase of 14, notwithstanding that they had lost two or three by death. That increase he believed had since gone on. As regarded the number of members, there had been a slight decrease, the numbers having been 96 in 1881, and 92 in 1882. He did not attach much importance to that, because in new societies a certain number of members often put down their names at first and did not continue them afterwards. As to the Preliminary examination, the result was most satisfactory. At the present moment it appeared by the list that 275 candidates had passed the Preliminary examination, and most of those gentlemen he presumed would hereafter come forward at the examination for the licence. Besides this, the Society having agreed to accept the Preliminary examinations of other licensing bodies, the number of those who had passed their own Preliminary examination did not represent all that would ultimately seek to become licentiates of the Society. Their Treasurer would no doubt place a more or less satisfactory account before them. He understood that they had been able to lodge £100, which was a satisfactory circumstance. With respect to illegal compounding, the Society had been doing their best to put a stop to it. He firmly believed every member of the Council was of opinion that the success of the Society depended on the determination with which they carried out the law as it existed in the country. Frequently there were great difficulties in the way of carrying out these prosecutions, but they had been successful in the two they had tried this year. No doubt one of them had cost a considerable sum of money, but they did not look on the matter as one of merely pounds, shillings, and pence. They prosecuted not from any animus against individuals, but to show that they were determined, if possible, to put an end to illegal compounding. One prize had been given this year by a member of the Council to a young licentiate who competed for it. He (the President) had not seen the prize essay, but the examiner in chemistry and another gentlemen who read it had reported that it was one of the cleverest essays they had seen for many years. This was in itself a mark of progress, showing that they had amongst them young men who were likely to make a name in the scientific world.

Mr. Hodgson, Treasurer to the Society, in submitting the balance sheet for the year, said it showed that they commenced with a balance in the Bank of Ireland of £133 4*s.* 2*d.* The amount received during the year was £289 19*s.* 2*d.* That included £68 5*s.* for the subscriptions of sixty-five members. The total income for the year was £432 2*s.* 4*d.* The cost of prosecutions amounted to £29 3*s.* 2*d.*; while they received £3 for a fine imposed on one party prosecuted. He was aware that the feeling of the Society was that it was most desirable to put down illegal compounding, and there was no doubt whatever that the Council was the proper body to move in the matter; but their income was limited and law was an expensive luxury; and although many members might think that if the Council did their duty they would have had even more prosecutions, there was no doubt that if they repeated these prosecutions very often it would cost a very considerable sum of money indeed. It might, therefore, be desirable to consider whether some arrangement could not be come to by which the parties who would be benefited in the towns or districts in which the prosecutions took place would recoup the Society for the expenditure thus incurred. A sum of £100 10*s.* 5*d.* had been invested in 3 per cents. The cost of printing had been £44 7*s.* 3*d.*, and he had requested Mr. Fennell to get some estimates in connection with that department. There was an item of £42 9*s.* 2*d.* for the *Pharmaceutical Journal.* As a member of the Council he had always had the strongest possible objection to that. It was absurd to spend such a sum as a bonus in order to get £68 5*s.* for sixty-five subscribers. The final result of the present account was that they had only £17 5*s.* 11*d.* in bank, together with about £400 invested in the Funds.

The President stated that the account had been duly audited by Messrs. Allen and Hayes.

Dr. Collins moved the adoption of the account.

Mr. Wells seconded the motion, which was agreed to.

The President then announced that the report of the scrutineers of the ballot was as follows:—Dr. Aquilla Smith, 50 votes; Mr. H. Bennett, 46; Mr. J. C. C. Payne, 45; Mr. Minchin, 40; Dr. Henry Whitaker, 38; Mr. McIlwaine, 36; Sir George Owens, 31; Mr. Holmes, 29 votes; and Mr. Goulding, 20.

The President declared the first seven gentlemen duly elected to serve on the Council for the ensuing three years.

Sir George Owens said he had great pleasure in moving that Dr. Charles Tichborne be re-elected President of the Society. They were much indebted to him, and he was well entitled to any compliment that they could pay. It added honour and prestige to the Society to have for their President a gentleman whose writings were so well known.

Dr. Collins said he had much pleasure in seconding the motion, which was put by the Vice-President and carried unanimously.

Dr. Tichborne said he almost forgot how many times he had to thank them for re-electing him. He could conscientiously say as regarded whatever he did, whether it met their approval or not, that it was done with but one object and that was the benefit of the Pharmaceutical Society of Ireland. For reasons which it was not necessary to mention he accepted the Presidentship now; but he thought the time was come when they should consider whether it was not desirable to change the occupant of the office, so that it might not be a permanent position for one person. In fact, it was his intention before the next election to bring forward a notice of motion on the subject. He thanked them very much for their kindness.

Dr. Collins said he had great pleasure in proposing that Dr. Aquilla Smith be re-elected Vice-President. The same reasons applied to his re-election as to that of the President. They could not possibly have a better man, if he would do them the honour of accepting re-appointment.

Mr. Hodgson said he had much pleasure in seconding the motion. They all knew how much they owed to Dr. Smith. At the time of the inauguration of the Society no one gave more talent, acumen and attention to the working out of details than he did.

The President said he had much pleasure in putting the motion. He looked on Dr. Smith as a tower of

strength to the Society, and he hoped he would long remain with them.

The motion having been unanimously agreed to,

Dr. Smith said he accepted his reappointment with pleasure. He had always entertained an earnest desire to promote the interests of the Society and would willingly continue his efforts with that object.

Mr. Hayes moved:—

"That Mr. Hodgson be re-elected Treasurer."

And the motion was seconded by Mr. Simpson, and unanimously agreed to.

Mr. Hodgson said he was much obliged to them for re-electing him. It was his most anxious desire to conserve the funds of the Society with one special object, namely, that they might as soon as possible obtain for themselves a "local habitation." This object he had long had before him. Of course the Society were greatly indebted to the College of Physicians for their kindness in allowing them to meet there; but still they should remember that they were only there on sufferance and that they might at any time receive an intimation that the room was required for other purposes. If once their funds attained a certain amount he did not think subscriptions would be wanting from members in order to make up the balance of what would be required to provide its own rooms for the Society.

Mr. Holmes: I think such an arrangement would soon become self-supporting.

Mr. Brunker moved:—

"That Mr. Fennell be re-elected Registrar."

They all knew how efficiently that gentlemen discharged his duties.

Mr. Hodgson seconded the motion, which was agreed to; and Mr. Fennell returned thanks.

On the motion of Mr. Holmes, seconded by Mr. Doran, Mr. Allen and Mr. Hayes were re-elected Auditors.

On the motion of Mr. Grindley, seconded by Mr. Simpson, the Law Committee were re-elected.

On the motion of Mr. Beggs, seconded by Mr. Holmes, the Committee to visit Examinations for the Licence were re-elected.

On the motion of Mr. Brunker, seconded by Mr. Collins, the following were elected the Committee for examining certificates of candidates for the licence:—Dr. Collins, and Messrs. Brunker, Allen, Payne, Hayes and Lester.

The following were re-elected the Pharmacy Act Amendment Committee:—Messrs. Allen, Draper, Hayes, Collins, Payne and Brunker.

Mr. Hatchell Whitby moved the following resolution:—

"That a Committee of twelve members, or such other number as shall be agreed on, of whom not less than one-third or more than one-half shall be members of the Council of the Society, be appointed with a view (*a*) to inquire into and report to the Council on the best means of rendering the Society more attractive to its members; and (*b*) to consider and recommend for adoption alterations calculated to induce licentiates to become members and to improve the prospects of the Society generally."

No one could hold the opinion that the Society was in a satisfactory condition. In the year 1880 they had 187 licentiates, 78 members, and seventy-two subscriptions. In 1881 they had 197 licentiates, 74 members, and fifty-three subscriptions. Their balance to credit in 1880 was £430, while in 1881 it was only £404. The members of the Society should be offered some advantages, such as a library and room in which they could meet for the purpose of consultation. He thought some money could be saved in connection with the printing of the Calendar. From 1878 to 1880 they paid £51 for printed matter, a large part of which he supposed consisted of the cost of printing the Calendar.

The President: We have a library here which is accessible to members. It is not very extensive at present, but we hope it will grow bigger. It contains some very valuable and useful books, of which one alone is worth £10, and the value of all is about £50.

Mr. Beggs seconded the motion.

Mr. Grindley supported it, and considered that much assistance in the promotion of the objects of the resolution could be given by outsiders.

Mr. Hodgson observed that the necessity of having a nice library was an additional reason for conserving their funds. When they had £1000 in bank they would be in a position to invite subscriptions for the purpose of getting a place of their own.

In the course of discussion, Mr. Brunker remarked that the fact that prosecutions for breach of the law had been so few, was due, not to any neglect on the part of the Law Committee, but to the difficulty of getting evidence. Several places had been reported as suspected, but the Committee could not get evidence against them. Still they knew that illegal dispensing was going on. Unless members of the Society and licentiates came forward openly and above board and gave evidence, it would be utterly impossible to have prosecutions. In several houses in that city it was known that the law was broken, but they were wide-awake enough not to afford evidence of it.

The resolution was put and carried unanimously, and it was agreed that the Committee should consist of eight members, viz., the mover and seconder of the resolution, Messrs. Bernard and Batt, and four members of the Council to be named by that body.

This terminated the proceedings.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the Royal Institution on Septemper 28.

The members having as usual partaken of tea and coffee, the President, Mr. Michael Conroy, took the chair at 8 o'clock.

The minutes of the last general meeting were read and confirmed and the following donations announced:—'The Smithsonian Report,' from the Association; 'Report of the Alumni Association of Philadelphia,' from the Association; The *Pharmaceutical Journal*, from the Society; The *Canadian Pharmaceutical Journal*, from the Editor; and the following Reports and Transactions of local societies from the respective societies:—Liverpool Naturalists' Field Club, Liverpool Philomathic Society, Liverpool Science Students' Association, Birkenhead Literary and Scientific Society.

The Hon. Secretary then read the following report of the Council for the past year:—

Annual Report.

"Your Council, in presenting to the Association this, the Thirty-third Annual Report, trust that it may show that the Association has maintained its satisfactory position among the societies of the city.

"Ten new members have been elected; three members and one associate have resigned; but owing to the Council having removed from the list of members and associates the names of several gentlemen whose membership has, from various causes, lapsed, the totals have slightly diminished, and are—honorary members 19, ordinary members 99, associates 18; total 136.

"There have been thirteen general meetings during the session, at which papers and communications upon important and interesting subjects were read.

"The Associated Soirée, in which the Association again participated, was in every way a success. Messrs. A. C. Abraham, Conroy and Mason have been appointed delegates from the Association to the General Committee for the forthcoming soirée.

"An insufficient number of students having come forward to attend the Organic Chemistry Class, usually conducted by Mr. Davies, that class was not held, and the customary examination for the President's prize did not, therefore, take place. The attendance at the Inorganic Chemistry Class was, however, good.

"At the meeting of the British Pharmaceutical Conference, recently held at Southampton, the Association was represented by Messrs. Symes and Mason.

"Several valuable additions have been made to the Library during the session. The various periodicals have been bound up to a recent date. Three series of the reports of the Association, as complete as possible, have also been bound. One of these has been forwarded to the Pharmaceutical Society, at their request; one to the Liverpool Free Library, at the request of the Librarian; and one retained for our own Library. The number of volumes, etc., issued from the Library has been 423, and the references have been numerous.

"At the last general meeting Mr. Joseph Woodcock was elected President in succession to Mr. Conroy, who desired not to be again put in nomination, his time being too fully occupied to allow him to fill the office to his satisfaction.

"Messrs. E. Davies, R. M. Sumner, Alex. Watt, and Thomas Williams retire from your Council, their term of office expiring this evening; they are, however, with the exception of Mr. Alex. Watt (who has retired), eligible for re-election, and have signified their willingness to continue their services.

"The Hon. Treasurer's Financial Statement ashows balance in favour of the Association of £4 18*s.* 8*d.*"

The Hon. Treasurer, Mr. R. M. Sumner, then read the annual statement of the financial position of the Association, from which it appeared that although the balance in hand was not large, the condition of the Association was pecuniarily satisfactory.

On the motion of the President, seconded by Mr. Joseph Woodcock, it was resolved:—"That the report as read be adopted, and, together with a list of members and abstract of proceedings of the past session, be printed and circulated among the members."

Mr. R. M. Sumner then moved:—"That the best thanks of this meeting be given to the donors to the Library, and to the authors of papers during the session." Mr. H. O. Dutton seconded this motion, which was carried unanimously.

The following motion, proposed by Mr. Parkinson, seconded by Mr. Samuel, was also carried:—"That the best thanks of this meeting be given to the officers and Council for their services during the past session."

The election of four members of Council then took place, and Messrs. E. Davies, R. M. Sumner, T. Williams and R. Parkinson were duly elected.

There being no further business brought forward the proceedings terminated.

LEEDS CHEMISTS' ASSOCIATION.

The annual meeting was held in the Library, Church Institute, Leeds, on Wednesday, September 20, 1882. Mr. E. Yewdall, Vice-President, in the chair.

The Honorary Secretary, Mr. Hellowell, read the following reports:—

"The Committee meet you to-day under exceptional circumstances and regret to have to state that since the last meeting of the society our President, Mr. T. B. Stead, has passed away from us. In all matters connected with the trade, Mr. Stead, by his regular attendance at the meetings, unostentatious manners and judicious remarks, did much to forward its interests. Several members of the society attended his funeral, and the Committee, at a special meeting convened for the purpose, passed a resolution of condolence with Mrs. Stead and her family.

"The great depression which has affected our trade for some time and still presses upon us, having produced a feeling of dissatisfaction in the minds of some, has no doubt been the cause of the society not making any addition to the list of members and associates during the past year; but as there are indications of an improvement it is hoped that there will be more interest shown in our work and a consequent desire to join our ranks.

"The Committee have carefully considered the desirability of affording an opportunity to all those not connected with us to do so by lowering the membership fee, and the subject will be brought before you in a formal manner at this meeting.

"The society is greatly indebted to J. J. Humel, Esq., F.C.S., for a very interesting lecture 'On the Chemistry of Dye Materials used in Pharmacy,' given by the kind permission of the Governors of the Yorkshire College, in the new Technical Schools, College Road, at which there was a good attendance.

"The Library has been thoroughly cleaned, the walls and ceiling have been recoloured and whitewashed, affording a comfortable room for any of the associates wishing to consult the various excellent books of reference or to examine the specimens of materia medica in the cabinet. It has also been regularly supplied with periodicals, including the *Pharmaceutical Journal*, *Chemist and Druggist*, *Chemical News*, *Nature*, and *Science Gossip*.

"The Committee hope the associates will make a greater use of the advantages offered by such a good library so centrally situated.

"The lectures upon chemistry at the Mechanics' Institution and Yorkshire College, to which associates of this Society are admitted without any extra charge beyond the lecture fee, afford opportunities for the systematic study of this science in its various branches, and to those youths who wish to thoroughly learn the Committee strongly recommend them.

"The botany class at the College is another means by which associates can make themselves well acquainted with this subject, and if masters will allow their apprentices and assistants, wishful to attend these lectures, the opportunity of doing so, they need not ask for better opportunities of acquiring the knowledge required for them to pass their examinations."

The Treasurer's report showed a balance in favour of the Society of £8 5*s.*

The following gentlemen were unanimously elected officers for the ensuing year:—President, Mr. S. Taylor; Vice-President, Mr. J. Abbott; Honorary Secretary, Mr. J. Hellowell; Treasurer, Mr. J. A. Hirst; Committee, Messrs. T. Barrowclough, P. Jefferson, W. Manfield, R. Reynolds, F.C.S., W. Smeeton, E. Yewdall.

Mr. Yewdall proposed the best thanks of the Association be given to the Pharmaceutical Society for the gift of the Journal, also to the British Pharmaceutical Conference for the gift of the Year-Book of Pharmacy.

Mr. P. Jefferson, gave notice of alteration of a rule:—"That the annual subscription be reduced from 10*s.* to 5*s.* per annum."

BOLTON DISTRICT ASSOCIATION OF CHEMISTS AND DRUGGISTS.

The annual meeting of the above Association was held at the Commercial Hotel, Town Hall Square, at 7·30 p.m. on Tuesday evening, September 19, when upwards of twenty-five members with a few friends sat down to an excellent dinner. After the removal of the cloth the usual loyal and patriotic toasts were given, and the following report of the Committee was read by the Secretary, Mr. W. B. Mason, F.C.S.—

"In presenting the members of the Association with a report of the work done during the past session, your Committee congratulate the Association on the increase of the numbers now on the books. During the year the rules have been revised, and assistants and apprentices

are now admitted on payment of a small annual subscription. By this slight alteration the numbers of the Association have been increased by ten, making a total of forty members. In consequence of the Association not meeting until March of the present year, there have been no general unions for the discussion of trade topics, but your Committee trust that during the winter a series of evening meetings will be held as often as is deemed convenient. The wants of the younger members of the trade have not been neglected, the room kindly placed at the disposal of the Association by Mr. Priestley having been furnished with a very complete collection of materia medica and botanical specimens, which your Committee hope ere long will be materially augmented by a donation from the Pharmaceutical Society. Arrangements have been made for a series of classes during the winter months in the subjects of the Minor examination to which your Committee hope the attention of the apprentices will be directed."

The report having been received and adopted, the meeting then proceeded to the election of officers for the ensuing session, after which Mr. W. Blain, the President-elect delivered his annual address, urging upon chemists the necessity of united action, more especially with regard to the education of apprentices. After pointing out to the members the courses of lectures arranged for the coming winter, especially thanking the wholesale houses who so kindly contributed to the materia medica collection, the President concluded by appealing to the members of the Association on behalf of Mr. Buott, a gentleman who formerly greatly interested himself in Bolton chemists, but who now unfortunately is in great distress.

As a direct result of this appeal it may be stated the sum of 24*s.* 6*d.* was subscribed, and has since been forwarded to Mr. R. Hampson.

The remainder of the evening was occupied with recitations and songs, and a most successful meeting brought to a close with the National Anthem.

YORK CHEMISTS' ASSOCIATION.

A meeting of the above Association was held at 9, High Ousegate, on Friday evening the 29th ult.

Mr. Councillor Dawson presided, and the following officers were elected:—President, Mr. Dawson; Secretary, Mr. Scruton; Treasurer, Mr. Sawray.

A committee was appointed to make arrangements for meetings and lectures during the winter months.

It was also decided that a room should be engaged at the above address where the books and specimens belonging to the Society will be available for the use of the assistants and apprentices connected with the trade.

PRESTON CHEMISTS' ASSOCIATION.

At a meeting of this Association, the prizes and certificates gained by the students in the science classes last session were distributed by Mr. J. Scott, Vice-President, who congratulated the students on their success, and hoped the ensuing session would be equally satisfactory.

Proceedings of Scientific Societies.

BRITISH ASSOCIATION.

Gas Burners.*

BY WILLIAM SUGG, A.I.C.E.

Coal gas, as now supplied to the public, consists of hydrogen and marsh gas to the extent of about 80 per cent., and the remainder consists of luminous hydrocarbons of various qualities, with traces of sulphur in the form of disulphide.

The gas supply of London is watched over by a Commission, appointed by the Board of Trade, called gas referees, who are Professor Tyndall, Professo Vernon Harcourt, and Mr. Pole. They are empowered to prescribe the manner of verifying the illuminating power and purity of the gas, and they have also authority to act in cases of dispute in public lighting. Their prescriptions, as emanating from the only legal body of the kind in the kingdom, are accepted as the proper methods, so that in effect, though they are appointed in London, they may be said to be gas referees for the whole kingdom. But the use that is made of gas is a matter which is altogether out of the control of gas companies and their engineers, and here the proverb about food and bad cooks may be paraphrased. The great hindrance to the improvements in the use of gas has been the general public themselves, who have not taken sufficient interest in the kinds of apparatus employed, but have, as a rule, supplied themselves with the cheapest burners, stoves, and other apparatus, utterly regardless of the waste and annoyance which this system entailed; and when they have complained, they have always attributed the causes of failure to the quality or pressure of the gas, instead of ascribing it to the true cause.

In 1871, the gas referees made an examination of a number of gas-burners which they had collected from various large establishments, newspaper offices, warehouses, shops, and dwelling-houses, and they found that those burners (samples of those generally employed by the public) would only give about one-half the light that the gas was capable of yielding per cubic foot consumed, and several of the burners tested by them gave only one-fourth of the proper light of the gas.

They say in their report to Parliament:—"The economy to the public, arising from the use of good gas-burners instead of bad ones, is so obvious as hardly to need remark. The gas rental of London amounts annually to more than two millions sterling. Taking a very moderate estimate, upwards of one-fourth of this sum (£500,000 per annum) might be saved by the use of good burners. This is the saving which might be made in London alone; how much vaster the sum thus economized if good gas burners were to come into general use throughout England."

Now, the quantity of gas used in London last year, according to the analysis of the London Gas Companies' accounts, prepared by Mr. John Field, was in round numbers, 20,230,000,000 cubic feet, which is equal to a bulk of 1 mile square × 726 feet high, and its cost to the public was £2,911,000.

The result of careful trials, made with a number of burners taken lately from private houses and shops, shows that, as a rule, the amount of light obtained by the general public, from five cubic feet of gas, is less than one half of that which it is capable of giving. The iron and metal burners, of which a great many are used, give the best result in light when they are worn out, although the shape of the flame is bad. The reason why, is that in order to obtain from what is a compound of hydrogen, marsh gas, and carbon, its best effect in light, the burner must be so made that the quantity of gas required to be consumed is proportionate to the size of the burner, so that it cannot exceed the maximum quantity which the burner is made for. Then the outlet of the burner itself, whether it be of the Argand or the flat-flame form, must be so arranged that the gas issues forth at a sufficiently low rate of velocity, so that it has time to get heated to a proper degree by the hydrogen and marsh gas before it comes into combustion with the oxygen of the atmosphere. When this rate of velocity is obtained in an Argand burner, the pressure at the point of ignition is almost *nil.* In flat-flame burners the pressure of the gas must be raised to a point sufficient to blow out the flame to a fan-like shape, but it must only be sufficient to do this if it is desired to obtain a good result per cubic foot of gas consumed.

One more point is of great importance in the construction of a gas-burner—that is, that the gas should

* Abstracted from a paper read before the Mechanical Section of the British Association, at Southampton. Reprinted from the *Journal of the Society of Arts.*

not be heated until it arrives at the point of ignition. The body of the chamber below the point of ignition must therefore be made of material which is a bad conductor of heat; so as not only to prevent the undue expansion of the gas before it arrives at the point of ignition, but also to maintain the heat in the flame.

Sir Frederick Bramwell very ingeniously pointed out, some time since, that the important point in the proper combustion of gas is not so much to keep the gas cool as to keep the flame hot. The distinction is extremely subtle; but, nevertheless, a non-conducting gas-chamber performs both these important functions. If a gas-chamber made of metal or any good conductor of heat is used, then the gas becomes expanded in bulk, and the velocity of the issuing gas is greatly increased; less time being given for chemical combinations necessary to produce a proper amount of light from it. In addition to this, as Sir Frederick Bramwell has pointed out, the heat which should remain in the flame is conducted away from it into the lower fittings of the burner, where it may burn the fingers of the incautious consumer, but it is of no manner of use in the evolution of light.

You will, perhaps, say it is not possible to conceive how the flame can be kept hot without keeping the gas cool at the same time, because if the heat is to be kept in the flame, and not conducted away down the stem of the burner, the gas must be kept cool by the means employed. But, nevertheless, there is a difference in the effects produced, and the ingenious definition of Sir Frederick is scientifically accurate. As an explanation of the expansion theory, it may be stated that if 1 cubic foot of gas is heated to about 500° F., it will occupy the same bulk that 2 cubic feet do at the mean temperature of the atmosphere. Now, supposing it is issuing in a cool state from the aperture of the burner at a velocity equal to 1½ mile per hour, it must then issue at 3 miles per hour, if the rate of consumption is equal in both cases. Therefore it has only half the time in the heated state to combine with the oxygen of the air that it had in the cooler state, and a loss of illuminating power is the result. Again, as regards the maintenance of the heat in the flame; supposing the chamber from which the gas issues is a conductor of heat. In this case the heat from the flame is conducted away from it down the stem of the burner, expanding the gas and leaving the flame so relatively cooled, as to require more gas to raise it to the necessary state of incandescence to allow the oxygen to combine with it in the proper proportions. In this case, as the two operations are simultaneous, it is difficult to apportion the effect produced. But that the effect is produced is proved by the following experiments, made some time since by the late Mr. F. J. Evans.

Two Argand burners were made precisely alike in every respect, except that one had a combustion chamber made in steatite, and the other in brass. The same quantity of gas was consumed through both of these, the result being that the burner with the non-conducting chamber gave more light per 5 cubic feet of gas consumed than the other, the proportion being as 15 candles to 13. The burner with a non-conducting chamber was quite cool immediately below the chamber, while the other was so hot that it could not be touched without burning the hand. The metal burners which are now used in enormous quantities in London and the provinces become exceedingly hot, so much so as to communicate the heat to a considerabe distance down the fittings. The velocity of the issue of 5 cubic feet per hour of gas from these burners, varies from 10 to 60 miles per hour. The worn-out burners generally give the lowest velocity. As a rule, the metal burners give the lowest result in light per cubic foot of gas consumed.

For example, a metal burner of the flat-flame type, which has been stated in the columns of the *Journal of Gas Lighting* to be identical with the steatite hollow-top burner, invented in 1868, gives the following results:—A large-sized burner, No. 8, burning 5 cubic feet per hour, gave a result equal to 11·5 candles, whilst the result obtained with a like quantity of gas from a steatite burner of corresponding size, which has a non-conducting gas-chamber, was 14·6 candles, a difference in favour of the steatite of 3·1 candles, or nearly 25 per cent. more light. Another metal burner, of a size more generally in use by the public, only gave 6·2 candles for the 5 cubic feet, or considerably less than half the latent value of the gas, which was 16 candles.

The fact of the difference of illuminating power, with like quantities of gas, clearly shows that the two burners are not the same by any means. The statement gravely made in the columns of the *Journal of Gas Lighting* that they are identically the same, clearly shows that if this is the belief of the gas trade generally with respect to these two burners, it is no wonder that the public, who rely on the recommendations of the trade, continue still to waste their gas in the manner pointed out by the gas referees in 1870 and 1871.

As before stated, careful tests of a collection of burners, bought from different gas-fitters and ironmongers in various towns in England, and from their recommendations, prove that the knowledge of the proper use of gas possessed by those persons is still most incomplete, and, therefore, the general public continue still to burn gas in the same wasteful manner as they did when the gas referees made their report.

The remedy for this enormous waste of gas is in the hands of the public only. Gas producers whether they are corporate bodies or public companies, are almost powerless to oppose the vested interest which derives large profits from the sale of gas-burners constructed with a view to require frequent renewals. It is only fair to say that the producers of gas have always shown the greatest interest in the improved use of gas in every way; but the speculating builder and his colleague, the local plumber and gas-fitter, hold a final power for evil over the employment of gas, which, till very lately, has been paramount.

Happily for the gas interest, the general public are beginning to take a deep interest in gas, and are acquiring a great amount of information concerning it, through the numerous gas exhibitions which have been held under the auspices of gas companies and corporate gas committees throughout the kingdom, and it is to be hoped that the forthcoming exhibition at the Crystal Palace, in October next, will very largely aid the good work of instructing the public how to use gas to the best advantage. Thus we may hope that soon the ring of interests inimical to the progress of gas will be broken through, and fresh encouragement given to the inventors of improvements in the use of gas. It will be impossible, in the limits of this paper, to give you a complete idea of all the improvements which have been, and are still being made; but I propose to indicate the direction they are taking, and give you a general idea of what they are.

It has been found that a comparatively large quantity of gas, about four to six times that ordinarily used, will give a much better result from one burner per cubic foot of gas consumed than can be obtained from four or six separate burners consuming the aggregate quantity of gas equal to that consumed by the large one; and this is true of both Argand and flat-flame burners. This is by no means a new idea; it was known to Faraday and others before him. I have in my possession an old burner made many years ago; it has several rings and a silver top drilled with very fine holes. The quantity of gas used is large—the effect is small—in fact, it is more useful for boiling water than for giving light. But this old burner is a type of the large Argands of twenty or thirty years ago. They did not succeed, because although they produce a great amount of light, it was at the cost of too much gas. Modern Argands will produce just double the amount of light for the same quantity of gas.

There is also incorporated in some of the newest burners now before the public an idea which was

originated by Professor Frankland more than ten years ago, viz., that if the air for combustion supplied to a burner be heated before it arrives at the point of ignition, a much better result per cubic foot of gas consumed can be realized. This you will perceive is a mode of carrying out Sir Frederick Bramwell's idea of keeping the flame hot, and undoubtedly a better result can be obtained. This burner, although it did not come much into use, has very lately been repeated, and is now being sold on the Continent. The burner is so much like Dr. Frankland's that there is no difficulty in recognizing it at once.

Of the modern Argands, there are now several kinds; one is made with two or three concentric rings of flame and a glass chimney, and is made with non-conducting steatite gas-chambers, and apertures permitting the gas to issue under an almost inappreciable pressure at the point of ignition, the velocity per hour being only about 1½ mile. In this kind of burner the gas is kept cool and the flame hot. These were first used in the public lighting of Waterloo Road, in 1879, and in Waterloo Place and Queen Victoria Street.

Another kind, of newer type, is made on the theory of keeping the flame hot by making use of the products of combustion to heat the air-supply. This also combines the low velocity of emission theory, and likewise heats the gas itself. It is made by inverting the flame of the burner, the heat generated by the products of combustion being carried away by a concentric flue, fastened round the burner, through which metallic tubes convey the air necessary to produce combustion, which thus becomes heated.

A third is constructed on the principle of keeping the flame hot and the gas cool, but has besides an arrangement for admitting separate currents of cold air round the flame, for the purpose of keeping the chimney cool. It was important to observe that, although this burner does not warm the air admitted to it for promoting combustion, yet the results per cubic foot of gas consumed are stated to be as high as any of the others, showing clearly that there is no advantage in heating the gas before combustion. As to the advantage obtained by heating the air, the practical effect upon an Argand suitable for use by such ordinary unskilled labour as is usually employed to look after gaslights, has not yet been clearly demonstrated; although it is without doubt a great advantage to burners of the flat-flame type, because these have always too much cold air supplied to them.

The Argand, with its more complete regulation of air and its immunity from the effect of surrounding cold air, is able to evolve from 15 to 30 per cent. more light per cubic foot of gas consumed than can be obtained from the best flat-flame burner; but, although the general public have no objection to glass chimneys in paraffin and other oil lamps, they do not appear to look with favour upon the general employment of glass chimneys for gas-burners, no matter how much better the result to be obtained. I need not say that the cordial support of the ring inimical to the true interests of gas is given to the public on this point, and a great deal of very strong literature condemnatory of the Argand burners has been widely disseminated. But it is impossible, in the face of the improvements which are continually being made in gas-burners of the Argand type, to believe otherwise than that they are destined to play an important part in the gas-lighting arrangements of the future. The improvements in the flat-flame burners, though not producing such high results as those obtained from large Argands, are great, and, concurrently with improved lanterns, have placed the lighting of the public streets on a much improved footing. Here, again, about three times the amount of light per cubic foot of gas is obtained from the use of large burners than with the old-fashioned small ones. The consumption of gas by the large ones is only equal to the aggregate consumption of four or six smaller burners. In addition to this, the improvements in the reflecting tops of the lanterns make the new lamps still more effective, and may fairly be said to double the effective power. In internal lighting, the progress of gas has been very considerable of late years. Small burners for rooms have been greatly improved. For large rooms and theatres new kinds of sun-burners are made, to give three times the amount of light obtainable from the old ones, and to ventilate the buildings at the same time.

One of the greatest advantages of gas is that the heat generated by the combustion can, if properly applied, be made to do the work of ventilation, and it is in this direction that the future progress of gas-lighting lies. There are many ways of utilizing this heat; some are extremely easy to put into practice, others require more preparation. Among the simplest, is the method of ventilating rooms by the fish-gill ventilator, invented by the late Goldsworthy Gurney. It consists simply in covering an opening made in the wall with strips of calico fastened across the hole by tacks put into the two upper corners of each band. The bands are made just long enough for the lower part of the superior band to cover the top part of the inferior one. When fixed properly, they open like the gill of a fish, hence the name. They can be used to let in fresh air, or carry off heated air from the top of a room.

These useful and simple ventilators, if employed in rooms where gas is used, would tend greatly to the comfort of the public who require a good light, but complain of the resulting heat. They work when closed by diffusion, the heated air passing through the porous medium of the calico, and the cooler air from outside the rooms passing in without draught. For the ventilation of ball-rooms it is very easy to put into the windows a frame fitted with muslin or washed calico of half or even the full size of the window. Ventilation will thus take place by diffusion, and the draughts and danger resulting from incautiously-opened windows will be avoided. If the wind blows hard on this opening, it may be protected by a loose curtain of muslin or calico hanging in front of it.

You will perceive, therefore, from what I have said, that the progress of invention in gas lighting is great and continuous, and that in the future, if the public will only interest themselves just sufficiently to obtain a moderate amount of information on the subject of gas, they will be enabled to use it with great economy and comfort to themselves in every way. The facile manner in which gas can be employed to produce the light of a rushlight or the blaze of a thousand candles by the mere turn of the wrist, joined to the readiness with which it can be conveyed to great distances without any practical loss, will always ensure a large and growing demand for it everywhere.

But it must be remembered that its extreme adaptability renders it capable of being used with the most crude apparatus as well as the most perfect; and when we see in the public streets the blazing pipe and shovel, a rough but powerful burner of from 100 to 600 candles power, rigged up in a few minutes by a navvy, we must not be surprised at the prevalence of crude apparatus of smaller dimensions put into practice by the public, who are not aware that they can do better with a more perfect burner.

Parliamentary and Law Proceedings.

Suicide of a Chemist and Druggist.

On Saturday, October 7, the Deputy Coroner for Bristol, Mr. E. M. Harwood, held an inquest at 51, White Ladies Road, on the body of John Facey, aged 42. Deceased, who had been carrying on business as a chemist and druggist at the above address, was found dead in a bath-room early on Saturday morning, under circumstances which led to the belief that he had committed suicide.

John William Newhill, an assistant to the deceased, said that he had known him for about two months, and during that period he had noticed that he appeared very ill at

times. Witness did not think he was satisfied with his business with regard to the amount of money he had paid for it and the returns. Any person who understood the business could be of no other opinion. Deceased was married on September 6, and witness had every reason to believe that he lived very happily with his wife. He had at times spoken to witness about his business affairs, and complained that his returns were not in proportion to the money he had paid for the concern. Witness believed that he paid £750 for the business, but there was a stipulation that he was to pay £26 in addition to that sum if the returns came up to £800 in the first year. As Mr. Facey's assistant, witness was satisfied that the returns were not adequate, and that if the deceased had kept the establishment up and conducted it as it should be he would lose £150 a year by it. For the first few weeks when witness was there deceased was very irritable, and complained very much about the price he had paid; but latterly, although he complained occasionally, he did not appear so much irritated. Deceased left the shop about half-past six o'clock on Friday evening, and witness did not see him again alive.

William Player, brother-in-law to the deceased, said that on going into the bath-room he found the deceased laying on the floor quite dead, with a little bottle by his side.

Mr. Player, M.R.C.S., said that he was called in by the last witness to see the deceased, who was then dead, death having taken place some hours previously. The bottle produced, which smelt strongly of chloroform, was found by his side and on making inquiries in the shop witness found that about an ounce was missing. A handkerchief which had been saturated with chloroform was spread over his face, the effects of which would alone, he thought, have been sufficient to cause death. That afternoon he found in the left hand pocket of his coat a small bottle perfectly empty, which had contained about an ounce of prussic acid. Deceased smelt very strongly of prussic acid, and witness's theory of the affair was that he took the prussic acid first and then threw the handkerchief saturated with chloroform over his face to deaden the pain.

The Jury were of opinion that deceased was not in his right mind at the time, and returned a verdict to the effect that he committed suicide whilst in a state of temporary insanity.—*Western Daily Press.*

Review.

Pharmakognosie des Pflanzenreiches. [Pharmacognosy of the Vegetable Kingdom.] By F. A. Flückiger. Second Edition. Parts I and II. Berlin: Rudolf Gaertner.

Any work on pharmacognosy by the surviving author of the classic 'Pharmacographia' demands and is sure to secure the attention of all interested in materia medica. The work which is the subject of the present notice is a portion of what is nominally a second edition of a manual dealing with the natural history of the more important medicinal substances of vegetable origin, published by Professor Flückiger in 1867. But it is in reality a new book. Since 1867 'Pharmacographia' has appeared, and an enormous number of books and scattered memoirs upon allied subjects have been published, which required to be taken into account in order to bring such a work abreast of the times. How thoroughly this has been done is proved by the fact that the second part contains in several places information that has only been published since the issue of the first. Naturally the 'Pharmakognosie' has points of resemblance to the 'Pharmacographia,' and it includes most of the information contained in that work; but it is not merely 'Pharmacographia' in a German dress and indeed it presents some striking differences.

Probably the first feature that will catch the eye is the arrangement. As is known, in Flückiger and Hanbury's work the different articles of materia medica are arranged under the botanical orders to which the plants belong from which they are derived. In the 'Pharmakognosie,' however, this arrangement does not obtain, and, for reasons hinted at in the preface, the plan is adopted of classifying mainly in respect to the physical characters of the crude drug. As the whole of this scheme of classification will not be disclosed before the appearance of the third and concluding part, it will be premature to criticize it now, further than to say that as far as it goes the different substances described fall fairly well into the different classes and sub-classes in which they are found, though some curiosity is justifiable respecting the ultimate lot of some that are not yet dealt with. This feature is sufficiently interesting and important to justify a brief indication of its character.

The *First Class* includes "Vegetable Substances without Organic Structure," and it is subdivided into—"varieties of gum," "sweet exudations," "resin mixed with gum," "resins mixed with ethereal oils and gums," "resins with ethereal oils," "resins," "balsams" (aromatic acids, alcohols and ethers mixed with resin), "ethereal oils," "milky juices," and "extracts." The *Second Class* includes "Organized Substances," and is subdivided into—"substances in powder," "galls," and "vegetable organs not in the powder form," the last being an important subdivision, commencing towards the end of the first part and going entirely through the second.

In the subdivision of the First Class devoted to gums there are articles on gum arabic, Senegal gum, and tragacanth gum, and one in which the less important varieties of gums are briefly summarized. This subdivision well illustrates one of the features in which this work differs from 'Pharmacographia,' that it is written more specially for the German pharmacist, the article on Senegal gum, which in the English work only extends to ten lines, extending over three pages in the 'Pharmakognosie,' in accordance with the relatively greater importance of that gum on the Continent. Manna is the only representative of the "sweet exudations," and gamboge of the gum resins. The "resins mixed with ethereal oils and gum" are myrrh, olibanum, asafœtida, galbanum, and ammoniacum. The oleo-resins described are common, Venetian and Strassburg turpentines, Canada balsam, Burgundy pitch, elemi, and copaiba and gurjun balsams. Chian turpentine, which in 'Pharmacographia' occupies two pages, is, notwithstanding its recent resuscitation, left out in the cold, being only casually mentioned. Then come the "resins," which are colophony, sandarac, dragon's blood, guaiacum, mastic, and benzoin; but jalap and scammony resins are dealt with under their respective roots, and podophyllum resin and root are omitted. Next come the true "balsams," liquid storax, Peru and Tolu balsams. A subdivision of "essential oils" follows, but this only includes camphor and oils of cajeput and rose. By the way, in 'Pharmacographia' it is said that rose oil itself is no longer exported from Persia, and this is also implied in a statement in the 'Pharmakognosie' that it is only prepared for purposes of export in the districts south of the Balkans. But according to Douglas (*Pharm. Journ.*, [3], viii., 811), who is quoted as an authority by Professor Flückiger, "the greater part of the large quantities of rose oil consumed in Western and Northern India is imported to Bombay from Persia." The last two subdivisions in this class are the "milky juices" (opium, euphorbium, and lactucarium) and the "extracts" (aloes, liquorice, kino, catechu, and gambier).

It will be seen from this outline of one of the principal divisions that although the arrangement has some disadvantages,—as, for instance, sometimes the wide separation of drugs derived from the same plant or closely allied plants,—it has the merit of bringing together substances resembling each other in some of their characters, and thus facilitating their study by comparison.

As previously mentioned, the whole of the second par- is taken up with a portion of the "non-pulverulent" sub-

division of the Second Class ("Organized Substances"); this includes "roots," "rhizomes," "stems," "barks," and "bulbs." But the series of "subterraneous or partially subterraneous parts of plants" does not include the roots of *Actæa racemosa, Cochlearia Armoracia, Atropa Belladonna, Helleborus niger, Hemidesmus indicus, Chondodendron tomentosum* (or *pareira brava*), or *Ferula Sumbul*, or the corms of *Colchicum autumnale*. The woods are guaiacum, quassia, and red sandal (neither the wood nor the oil of *Santalum album* appears). In the subdivision devoted to barks the most important article is that on cinchona bark, which might indeed aspire to the position of a monograph on the subject. It is carefully brought up to date, including the latest information as to the origin of cuprea bark. We notice, however, that Professor Flückiger states that it is not established whether quinine sulphate crystallizes with 7 or 8 molecules of water, or a quantity lying between; in this he ignores the work done upon this subject by Cownley in 1876 (*Pharm. Journ.*, [3], vii., 189), from which it appeared that the freshly prepared quinine sulphate contains 7½ molecules of water of crystallization, but that when freely exposed to the air it effloresces rapidly until the proportion is reduced to 2 molecules, when it remains constant.

Although the possession of 'Pharmacographia' renders English students of materia medica practically independent of the work under notice, its publication is decidedly a valuable acquisition to German literature on the subject.

Correspondence.

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

The Poison of the Stinging Nettle.

Sir,—In his lecture on the "Irritating Effects of Stings," reported in your last issue, Professor Vogel says:—"The irritating action of stinging nettles and other similar vegetables depends on formic acid." The same statement is frequently made in botanical text-books. Can any of your readers refer to definite analyses from which it is deduced? Is it not a fact that the irritant fluid of the common stinging nettle always has an alkaline reaction? If this is so, it is difficult to reconcile with the presence of free formic acid.

St. Thomas's Hospital. Alfred W. Bennett.

The Keeping of Leeches.

Sir,—In reply to Mr. Baker, permit me to say that although both *Planorbis* and *Limnea* were present in my tank as well as *Paludina*, I have no hesitation in saying that the ova was that of the leech. A friend who is a noted naturalist, was of opinion, when first he saw them, that they were the ova of *Limnea*; but they agreed so very minutely with the description of the leech ova, in the original edition of Pereira, that I felt convinced my friend was wrong, and after watching every stage of their development, I had the satisfaction of proving to him that my opinion was the correct one, and for months I had a supply of leeches in every stage of development; they were seen by several gentlemen who were well qualified to form an opinion, so that there can be no possible doubt about the matter. I shall be glad to know if any other "keeper of leeches" has previously noticed this; those who are interested will find a very full and interesting account of the leech in the original edition of Pereira, vol. ii., part ii., pp. 2185, *et seq.*

131, *Embden Street, Manchester.* J. Hart.

Presence of Organisms in Solutions of Inorganic Salts.

Sir,—The interesting paper on this subject communicated to the Pharmaceutical Conference by Mr. Bothamley reminds me of a discussion on the same subject, which took place here and which may be of some interest in conjunction with Mr. Bothamley's paper.

In November last Mr. C. A. McPherson, of this city, brought before the Assistants' Association several samples of fluid magnesia containing a green deposit; this was shown by Mr. Boa to be composed of unicellular organisms, spherical in form and containing chlorophyll granules. It appeared identical with an alga which I had seen in laboratory magnesic sulphate solution. Mr. McPherson mentioned that it had developed in fluid magnesia obtained from various houses, and that the development took place in white flint glass bottles and not in those of blue glass. I have three of the samples still beside me; all of them have a heavy deposit of magnesic carbonate, in one bottle the crystalline mass is quite green, and the others show the organisms round the edge of the bottom. This is the only instance I have yet observed of the development of the organism in fluid magnesia.

One of the samples contains traces of ammonia and phosphoric acid. Sulphuric acid is also present to a small extent.

I agree with Mr. Bothamley that the organism is more like a species of *Chroococcus* than *Protococcus*; those which I have observed are non-ciliated and appear to multiply by cell division.

Should Mr. Bothamley continue his investigations it would be advantageous were he to direct his attention to the influence which blue light rays may have in retarding the development of the organism.

Peter MacEwan.

Pharmaceutical Society's Rooms, Edinburgh.

G. E. Post.—We hope you will be able to renew your work eventually, and do not propose to make any alteration in the supply of the Journal at present.

T. J. Wilkes is recommended to devote his attention to the study of the principles underlying chemical reactions rather than to attempts to represent what takes place by diagrams.

F. W. Richardson.—The Rainband in the Spectroscope.—A very interesting communication upon this subject, from Professor Piazzi Smyth, will be found in *Nature*, October 5, p. 551. After premising that the slit should be narrowed down almost to extinction, and the eye-piece focussed carefully, Professor Smyth gives the following instructions:—"Observe always low down near the horizon, for atmospheric effects in the spectroscope are there nearly twenty times as strong as in the zenith. Get an opening between clouds if you can to observe through. Prefer that the sun itself shall be angularly distant from your observing direction; and behind a cloud also, if possible, at the instant, so as not to illumine the motes in the air of your neighbourhood with its high altitude light. Especially avoid the minutes of sun-rising or setting, for that act, or rather position, brings certain of the dry gas bands into a short-lived maximum of intensity, without any other signification than that the sun *is* then on the horizon. But good observations may often be taken through falling rain, though not through falling snow, and also between the earth and the under sides of the clouds, if they entirely shut out all view of the air of the heavens beyond them."

J. D. Lawton.—Probably *Solanum Dulcamara*; send a flower.

X. Y. Z.—(1) *Achillea ptarmica*; (2) *Artemisia Dracunculus*; (3) *Scrophularia*: send leaves if you wish to know the species.

H. S. C.—See *Pharm. Journ.*, [3], x., 603.

"*Minor.*"—The employment of iodoform in what appears to be large quantities has been advocated recently by several medical writers. We do not think that the propriety of such treatment can be advantageously discussed in these columns. But it may be remarked that it would be as well for prescribers to remember that the intensity of the action would probably depend to some extent upon whether the compound is brought into contact with the diseased surface in a finely divided condition or in scales.

An Associate.—Your question can only be answered by the result of experiments which you are recommended to carry out for yourself.

J. T. Hall.—(1) *Galium verum*; (2) *Ulva latissima*; (3) *Gigartina mammillosa*; (5) *Porphyra vulgaris*.

Communications, Letters, etc., have been received from Messrs. Lawton, Modlen, Candy, Woodland, Ward, Agricola, Fritz.

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Practical Physiology, 3 p.m. } W. Limont, M.A., M.B.
Surgery, 12 noon—D. N. Knox, M.A., M.B.
Medicine, 11 a.m.—D. C. McVail, M.B.
Materia Medica and Therapeutics, 3 p.m.—Neil Carmichael, M.D.
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Medical Jurisprudence, 4 p.m.—Eben. Duncan, M.D.

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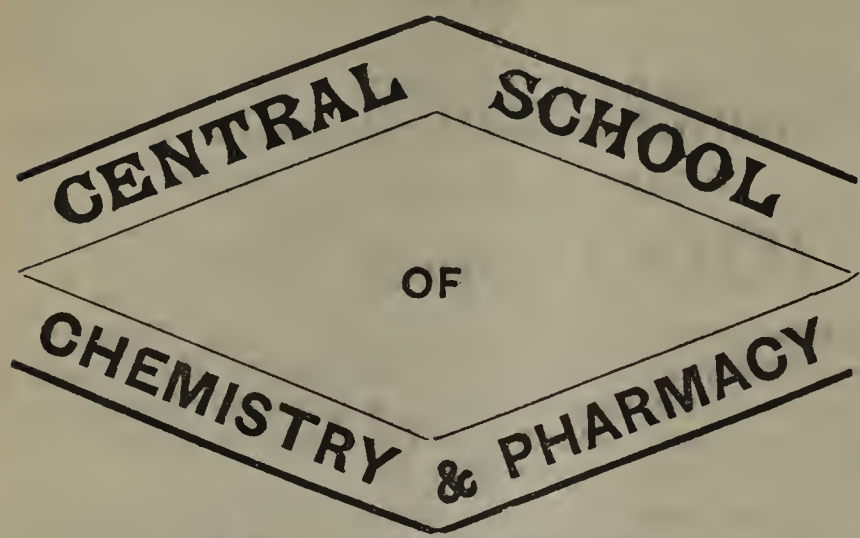

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SENIOR or MANAGER in first-class Retail and Dispensing business. Age 30. Height 5ft. 7½in. P. G. GODSELL, Buckingham House, Gt. Malvern.

AS MANAGER or out-door ASSISTANT. Qualified. Married. No family. Now disengaged. ALPHA, 48, East Hill, Dartford, Kent.

A MAJOR, and Registered Dentist, will be glad to make arrangements, permanent or otherwise, to assist or relieve gentlemen in their business. Highest references. A. H. C., 24, George St., Croydon.

AS Junior ASSISTANT or DISPENSER, in London. With time for study preferred. Age 21. Good reference. H. R. MORRIS, care of Messrs. Grimwade, Ridley & Co., Ipswich.

AS ASSISTANT. Devon or Cornwall preferred. Age 21. Height 5ft. 9in. 6 years' experience. Good references. Disengaged. Particulars to J. N., Mr. Buckett, Pharmaceutical Chemist, Penzance.

AS out-door ASSISTANT. 7 years' varied experience. Can Prescribe, Extract Teeth, &c. Highest references. Full particulars to J. W. KNOWLES, Thorne, Doncaster.

AS ASSISTANT or MANAGER. In good class business. Minor and Apothecaries' Hall qualifications. Out-door preferred. West-end experience. MEMUS, 42, Westfield St., St. Helen's, Lancs.

AS ASSISTANT. Ætat. 25. Accustomed to first-class Retail and Dispensing. Good Prescriber. Can Extract Teeth. Disengaged. MEDICUS, 101, London Rd., Neath, South Wales.

ENGAGEMENTS WANTED.

IN London or Provinces, by a fully qualified young French Assistant. Fair knowledge of English. Salary no object. MERCURIUS, 156, York Rd., Lambeth, London, S.E.

AS ASSISTANT in good Dispensing and Prescribing business. Not qualified by examination, but competent to Manage in principal's absence. 9 years' experience. Age 23. Height 5ft. 7in. Good references. M., 84, Praed St., W.

LOCUM TENENS. Mr. W. B. WEST, Staines Rd., Hounslow. Over 30 years' town and country experience, and unexceptionable references. Until 21st, care of Mr. Roberts, New Buckenham, Norfolk.

EVENING Employment in London or suburbs Either with Surgeon or Chemist. Capable of taking entire charge if necessary. A. T., Mr. Parnell's, Stationer, St. John's Hill, New Wandsworth.

AS JUNIOR. Disengaged. Age 24. Height 5ft. 9in. Churchman. Excellent references. W. R., 1, Spring Villa, Fletton Spring, Peterboro'.

AS JUNIOR, in London. Time for study preferred. Age 21½. 6 years' experience in good class business. Disengaged. Satisfactory references. EVANS, 4, Charteris Rd., Finsbury Park, N.

AS JUNIOR in good house of business. Age 22. Height 5ft. 10in. Out-doors not objected to. X. X. X., T. G. Cousins & Co., Pharmaceutical Chemists, Oxford.

ASSISTANTS WANTED.

JUNIOR or IMPROVER. Immediately. One just out of time, with Preliminary passed, preferred. Apply, stating age, height, and salary required, T. MATTHEWS & SON, Chemists, 167, Cambridge Rd., Mile End, E.

IMMEDIATELY.—A Junior ASSISTANT. About 22. Must be a quick and accurate Dispenser. Apply, personally, to W. THOMAS, 103, Talbot Rd., Bayswater.

GEO. E. PERRY, Pharmaceutical Chemist (by examination), 77, Hagley Rd., Edgbaston, Birmingham, has a vacancy for a well educated youth as APPRENTICE. First-class Dispensing business.

THE Self-aiding Dispensary, Grantham.—The office of DISPENSER to this Institution is now vacant. Candidates for the same shall be a registered Pharmaceutical Chemist or Chemist and Druggist on the books of the Pharmaceutical Society, London. Salary £80 per annum, with the use of unfurnished rooms. Candidate as a single man will be preferred. Highest references required. Address, W. V. HARDWICK, Secretary, Grantham. Communications not answered after two days may be considered in abeyance.

FOR South of France.—An out-door ASSISTANT. Retail and Dispensing Pharmacy. Apply Messrs. PLUMEY & QUAY, Nice.

PARIS.—In a first-class establishment, a Dispensing ASSISTANT is required, speaking French. No one need apply whose character and antecedents will not bear the strictest scrutiny. A liberal salary is offered in return for experience. Good address and serious business habits. Enclose carte (to be returned) with references, to CHIMICUS, Library, 224, Rue Rivoli, Paris.

MESSRS. CUBLEY & PRESTON require an ASSISTANT. Out-door. Unmarried. Minor qualification preferred. 4, High St., Sheffield.

MR. WILKS, Dispensing and Family Chemist, &c., has a vacancy for a JUNIOR about 20 or 21 years of age. One accustomed to a general country trade. Unexceptionable reference required. Address, stating age, height, salary, &c., to 191, High St., Lincoln.

ASSISTANTS WANTED.

A WELL conducted ASSISTANT, for a permanency. From 22 to 25. Must be recommended by last employer for sobriety, and to be of industrious habits and agreeable manners. Apply, enclosing photograph (to be returned), stating full particulars and salary required, to D. PROSSER, Sheerness, Kent.

A GENTLEMANLY ASSISTANT, with Minor qualification. Age not over 23. Must write a neat hand and be a good Dispenser. Apply, stating full particulars, enclosing carte and references, to R. H. GROVES, Pharmacist, Blandford.

WHOLESALE.—A LABORATORY MAN. Good experience essential. Address, with usual particulars, to A. Z., care of Meggeson & Co., Miles Lane, London, E.C.

AN ASSISTANT, from 25 to 30, in a Mixed country business. Of good appearance and manners. An accurate Dispenser. Apply, stating age, height, and salary, enclosing photo. and giving references, to MORGAN & SONS, The Cross, Newtown, Montgomeryshire.

A JUNIOR ASSISTANT in a good Dispensing business. One with Minor qualification preferred. Personal application to E. L. HICKEY, 199, King's Rd., Chelsea, S.W.

A THOROUGHLY qualified ASSISTANT, not under 25, of good appearance and address, and accustomed to first-class Dispensing business. Address, with age, height, and salary required, with carte (to be returned), OMEGA, care of Messrs. Barron & Harveys, Giltspur St., E.C.

A QUALIFIED ASSISTANT, about 25 years of age. Apply, enclosing carte, and stating age, height, &c., to R. A. SAUNDERS, 1, Mutley Plain, Plymouth. First-class testimonial required.

EARLY in November.—A steady trustworthy ASSISTANT for a light Retail and Dispensing business. Apply, with usual particulars, to R. W. STEVENSON, Chemist, Derby.

SENIOR or MANAGER. Permanent. Out-door. Unmarried. With good references. Address, stating full particulars of past experience, ALPHA, care of Messrs. Horner & Son, Mitre Sq., E.C.

MANAGER.—A gentleman of business habits, 25 to 30, for a good trade. Able to Prescribe, Extract Teeth, &c. Salary to commence £50, in-door. Also one having some means, but anxious for partial employment, for the Laboratory. Out-door. References must bear strict investigation. Address, with full particulars as to experience, &c., C., 64, Regent Rd., Liverpool.

IMMEDIATELY.—A steady and trustworthy JUNIOR (Minor preferred), accustomed to a country business, and a neat Dispenser. A vacancy for an IMPROVER and an APPRENTICE. Apply, stating age, height, salary (in-doors), with full particulars, to J. JOHNS & SON, Southampton. Enclose carte.

IMMEDIATELY.—A Junior ASSISTANT, in-doors. About 21. Of good appearance and manners. Accustomed to Dispensing. State height, age, salary required and reference. Enclose carte de visite (to be returned). Time for study. Address, E. M. STEVENS, Chemist, Eastbourne.

APPRENTICE.—J. C. THRESH, Pharmaceutical Chemist, Buxton, has a vacancy for a well educated youth in his Dispensing establishment. He will have exceptional advantages for acquiring a knowledge of Practical Pharmacy. Terms on application.

A COMPETENT out-door ASSISTANT in the Wholesale. Unexceptional references required. State length of time in last situation, experience, age, and salary required. Applications not replied to in 4 days not entertained. Address, SLINGER & SON, Wholesale Druggists, York.

ASSISTANTS WANTED.

ASSISTANT. To Manage a Branch. Able to speak Welsh, Draw Teeth, Prescribe, and a careful Dispenser. Apply, enclosing carte and references, JOHN EDWARDS, Chemist, Conway.

WHOLESALE.—A WETMAN. Must be accustomed to the work and have served an apprenticeship to either the wholesale or retail. Apply, stating wages expected and references, to X. Y., care of Meggeson & Co., Miles Lane, Cannon St., London.

IN a Chemist's establishment.—An experienced ACCOUNTANT, speaking and writing perfectly the French language. Preference would be given to a Chemist's Assistant answering these requirements. Address, PHARMACIEN, Poste Restante, Rue Cambon, Paris.

ASSISTANT, requiring time for study. Apply, W. WHINCUP, 404, Essex Rd., N.

ABOUT the 20th October.—An ASSISTANT (out-door), for 2 months. One accustomed to a good country business preferred. Address, giving age, salary required, and references, to T. RODERICK, Chemist, Pontypool.

OUT-DOOR. No night or Sunday duty. A JUNIOR for a light Retail and Dispensing business. Apply, giving full particulars as to experience, age, height, salary, and enclosing carte, if convenient, to ARTHUR BAINES, Piccadilly Bldgs., Hanley. Character must bear the strictest investigation.

QUALIFIED ASSISTANT. Age about 26. Competent to Manage a small good class Dispensing business during absence of principal. Situation west. Good references indispensable. Address, enclosing carte, M. R., Messrs. Hill & Son, 101, Southwark St., S.E.

AN ASSISTANT, about 23 years old. Must have had experience in a good Dispensing business and have passed the Minor examination. Apply personally to E. N. BUTT, 13, Curzon St., Mayfair, London, W.

A GENTLEMANLY and obliging JUNIOR, accustomed to good class business. Comfortable home offered and time for study allowed. Apply personally, if possible, or with full particulars, stating salary and enclosing photo, to Mr. WRIGHT, 128, Ball's Pond Rd., Islington, N.

AN in-door ASSISTANT. One accustomed to a good Family and Dispensing business. Apply, stating age, salary and reference, to H. A. CARTER, 165, Edgware Rd., W.

IMMEDIATELY.—An ASSISTANT, with Minor qualification. Age about 23. Out-door. Of good address. State height and salary required, with references, to HARDCASTLE & SAVAGE, East St., Brighton.

IMMEDIATELY.—In a good inland watering place. A first-class JUNIOR. For a permanency. Member of a Christian church preferred. Address, stating age, height, and salary required, to F. C. S., Messrs. Barclay & Son, 95, Farringdon St., E.C.

IMMEDIATELY.—A Registered ASSISTANT for a country Mixed, Retail, Dispensing and Prescribing business. Good character indispensable. State every particular to PEPSINE, care of Mr. Hulbert, Chemist, Glastonbury.

TO Temporary Assistants and others (married).—A Chemist in the E. district, 15 minutes by rail from City, desires to let the private part of his house unfurnished, at a nominal rental, in consideration of some little assistance daily, or one day a week. Highest references required. Address, TEMPORARY, care of Messrs. Hill & Son, 101 & 103, Southwark St., S.E.

AN ASSISTANT, of gentlemanly appearance and address, for a first-class Dispensing business, where 1 assistant only is employed. He must be an accurate Dispenser and accustomed to good class business. Full particulars (with carte) to H. C. BIRCH, Upper Norwood, S.E.

ASSISTANTS WANTED.

CLERK. By a firm of Wholesale Druggists in Edinburgh, to post ledgers and make out accounts, &c. Must be thoroughly acquainted with the business, and character bear strict investigation. Application by letter, stating age, experience, and salary expected, to CLERK, care of Messrs. J. & R. A. Robertson, 18, Queen St., Edinburgh.

IMMEDIATELY.—In an inland watering place. A qualified ASSISTANT. Of gentlemanly appearance and address. Accustomed to the routine of a first-class business. 3 assistants kept. Address (enclosing carte), giving age, height, salary required, and references, M. M. N., care of Messrs. Hodgkinsons, 198, Upper Whitecross St., E.C.

BY October 25.—A Minor Associate, for a light Retail and Dispensing business, who would be required to undertake the Dispensing for an Hospital. Highest references required as to character and ability. Dissenter and total abstainer preferred. Enclose photo. Address, Mr. CLARKE, L.D.S., Pharmaceutical Chemist, Lowestoft.

APPRENTICE.—T. JUDSON & SON, Chemists, Ripon, Yorkshire, have a vacancy for a well educated youth. Business hours, 8 a.m. to 7 p.m., except on Saturdays. Must be prepared to pass the Preliminary examination.

BUSINESSES FOR DISPOSAL.

A VERY much neglected BUSINESS. In one of the healthiest suburbs of London. Good house. Large shop. Plate-glass front. Mahogany fittings. Moderate rent. Lease 9 years to run. Price £250 cash. Considerably less than the value of stock and fixtures, as the proprietor is leaving the trade. Address, Y. Z., Messrs. Hill & Son, 101, Southwark St., S.E.

IMMEDIATELY.—A Chemist's BUSINESS. Rare chance. No opposition. Capable of great extension. In a rapidly improving suburb. Rent covered by letting. Address, MEDICUS, 15, Granville Ter., Cricklewood Rd., N.W. Price moderate.

LONDON, S.E.—Death vacancy. Good class Retail. In splendid position. Fixtures, 7 years ago, cost £500. Returns, under capable management, may reach £1000. Price £400. Mr. BRETT, Valuer, Leicester.

MR. HINE GILBERT begs to offer a good BUSINESS, returning £800 per annum, for £400 only, to include lease and goodwill of a most advantageous character. Good house. Apply immediately to 17, Hart St., Bloomsbury Sq.

SUNDERLAND.—An old established and profitable Mixed BUSINESS in Monkwearmouth. Successfully carried on for 67 years. Held by present proprietor 14½ years. Previously only in 2 hands. Declining the Retail. No goodwill. Stock at valuation, which can be reduced to suit purchaser. This being a genuine affair will stand full investigation. Only bonâ fide purchasers treated with. W. SANDERSON, Monkwearmouth.

BUSINESS in a flourishing town in Surrey, on the Thames. Select Dispensing and Retail. To be sold on moderate terms. Apply to J., care of Evans, Lescher & Webb, 60, Bartholomew Close, London, E.C.

SOUTH Devon.—In a market town, an old established BUSINESS, light Retail and Prescribing, at full prices. Present receipts over £550. Price £450. No agents. Thorough investigation allowed. Address, S., 100, New St., Birmingham.

GOOD opportunity for energetic man. To be sold, with immediate possession, a small old established BUSINESS, in a busy thoroughfare, London. Returning between £5 and £6 weekly, under management. Good house and lease. Will be sold cheap. Apply STATIM, care of Barclay & Sons, Farringdon St., E.C.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—SUSSEX. First-class Retail and Dispensing Trade. Returning £1500, at full prices. Good house. £1300, or offer. DORSET. Good Dispensing Business. Returning over £1000. Best position. Good house. £1000. Heavily stocked. BANKS OF THAMES. Good class Retail and Dispensing Trade. Returning £700. Good house, long garden. £600, or offer. LONDON, S.E. Returning £550 under assistant. Capable of increase. £450. N. Returning £7 weekly. Main thoroughfare. Greatly neglected. Only £130. ESSEX. Totally unopposed. Returning £700. Rent £22. Good house; garden. Well fitted and stocked. Reasonable offer. Please apply, 30, Jewry St., Aldgate, City.

MANCHESTER.—Profitable old established Drug BUSINESS. In one of the best positions. Satisfactory reasons for sale. Good house. Corner shop. Lease if desired. Apply, in first instance, to GEORGE JACKSON, Post Office, Manchester.

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A PROFITABLE light Retail and Dispensing BUSINESS. Well situated in principal business street of a good manufacturing town in Lancashire. Commanding shop. Handsomely fitted. Many years in present hands. Thorough investigation allowed. Returns about £1500, with prospect of considerable increase. Price £1100, or valuation. Address, P. C., care of Messrs. Barron, Harvey & Co., Giltspur St., London.

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A GENUINE good class Retail and Dispensing BUSINESS. Returning from £1000 to £1500. In London preferred. Particulars to C. D., 35, Alfred Pl., Bedford Sq., W.C.

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4 HANDSOME 16 gall. Carboys and Stands; 2 22in. French Jars; 10 3 gall. Carboys, 24 2 gall.; a number of Fancy Jars, fig. D, elaborately labelled, 10s. each; 24 3lb. Blue Ointment Jars; 12 6lb. White Jars; 12 4lb. White Jars; 18 Lilac 3lb. Ointment Jars, with japanned covers; 500 Shop Rounds, 8s. doz.; Extract Pots; a quantity Brown Jars, japanned covers; 36 1 gall. White Glass Bottles, gold labelled; Pill Machines; Brass Scales; Carboy Stands; Specie Jar Stands; a number Specie Jars, elaborately labelled, from 50s. pair; Iron Mortars; Wedgwood ditto; Glass Capped Ether Bottles; Tincture Presses; Leech Jars; 8ft. Plate-glass Case for centre of shop, similar to Maw's old list, fig. 124, £15, fitted inside with plate-glass shelves, worth double; a stout Sheet-glass ditto, £10; a number of Glass Wall Cases, bargains; a Dispensing Screen Tablet, in mahogany frame, with cornice, 40s.; an upright Case, 66in. high, 19in. wide, 70s.; a flat Plate-glass Counter Case, £5; Desk, enclosed with brass rails and ground glass, 50s.; 16ft. Sheet-glass Case for front of counter, £8; 6ft. Plate-glass ditto, ditto, £6; an upright Case for top of counter, 3ft. high, to open at back, 70s. E. NATALI, 207, Old Street.

THE entire Fittings of a Chemist's Shop, comprising mahogany fronted Drawers, with shelving over, Window Enclosure, Counters, Wall Cases, Dispensing Screen, Counter Case, upright Case and Desk, Bottles, Jars, Carboys, suitable for a shop about 18ft. deep. £35. Can be seen fitted in place after 4th October. E. NATALI, 207, Old Street.

20 FT. mahogany top Counter, £9; 20ft. mahogany front and top Counter, fitted with 20 drawers, £15; a 18ft. mahogany top ditto, £7; 8ft. ditto, ditto, fitted with 15 drawers the entire length, £6; 12ft. 6in. ditto, ditto, 24 drawers, £10; 5ft., 6ft., 7ft., 8ft. and 10ft. mahogany top Counters; a number mahogany top Cupboards; 16ft. Dispensing Counter, suitable for a dispensary, to fit against wall, fitted with sink, drawers and cupboards under, and shelving on top; a number of mahogany Nests of Drawers, 4ft., 6ft., 8ft., 10ft., 12ft., 16ft. long, with or without shelving over, glass knobs and bevelled edged labels. E. NATALI, 207, Old Street.

SPONGE Cases, fig. A 43, £5; fig. A 41, 65s.; Desk and Cases, fig. A 31, 65s.; fig. A 32, 45s.; a 10ft. 3in. bent Plate-glass Counter Case, brass frame, £9; a 9ft. 9in. ditto, ditto, mahogany frame, £8; 6ft. 6in. ditto, ditto, £7; 6ft. ditto, ditto, A 18, £7; 5ft. ditto, ditto, £6; 4ft. ditto, A 17, 90s.; 4ft. ditto, A 16, 80s.; 3ft. 6in., A 16, 70s.; 3ft. ditto, 60s.; 2ft. 6in. ditto, 50s.; 6ft. ditto, ditto, A 7, £7; 3ft., fig. A 8, 40s.; a large number of other Glass Counter Cases too numerous to mention in list; Plate-glass Dispensing Screens, 5ft. long, 6ft. long, 7ft. long, glass case at each end, with silvered glass centre, with marble slab in front, tablets on top, silvered glass backs inside cases, and fitted with movable shelves, very elaborate, £8 10s. each; a 8ft. Dispensing Screen, A 68; a ditto, ditto, 5ft. 9in.; Dispensing Screens, A 55, 5ft. long, £6; 6ft. long, £7; 4ft. 6in. long, with silvered plate-glass back inside, £7. E. NATALI, 207, Old Street, London, E.C.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 643.] SATURDAY, OCTOBER 21, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

APPROVED CANDIDATES.

1.—BROADWATER, ELIZABETH. Age 64. Oxford. Widow of William Broadwater, a Member of the Society from 1842 to 1853. Was in business at Amersham for twenty-four years. Died in 1866. She is in ill health, and has a daughter, [illegible] with epilepsy, dependent on her. *Second application.*

2.—DAVIES, HENRY EDWARD. Age 65. London. Member of the Society from 1842 to 1870, and for many years an annual subscriber to the Benevolent Fund. Has been paralysed for the last three years and is quite helpless. Applicant was in business on his own account in the City of London for twenty-four years, and subsequently Dispenser to the City of London Union for seven years. Has a wife, age 54 (suffering from tumour), and two children dependent upon him.

3.—DIXON, MARY ELIZABETH. Age 50. Widow of William Dixon, a Life Member of the Society. Died in 1878, leaving applicant with eight children, totally unprovided for; four of whom she has still to support, but receives a little temporary aid from two elder children.

4.—HENLY, MARY ANN. Age 64. Norwood. Widow of John Creed Henly, a Member of the Society from 1842 to 1880. Died in April, 1881. He was for many years Manager to a Wholesale Drug Firm in London. The widow has to support a daughter in delicate health and a son insane.
Second application.

5.—POWELL, MARY JANE. Age 65. Sidmouth. Widow of John Powell, a Member of the Society from 1842 to 1880, and a subscriber to the Benevolent Fund. Her late husband was in business for forty years at Shaftesbury. Died in 1880. She is in delicate health.

6.—ROWLANDS, AMELIA CATHERINE. Age 62. Devizes. Widow of the late W. S. Rowlands, who was a Member of the Society from 1853 to 1870. She is in a precarious state of health, suffering from feeble action of the heart, and extreme nervous debility. Has no friends in a position to render her any substantial help. *Third application.*

7.—SUTTERBY, CATHARINE MARY AMELIA. Age 57. London. Widow of J. N. Sutterby, a Member of the Society from 1841 to 1882, and a subscriber to the Benevolent Fund from 1874 to 1882. Applicant's late husband was in business at Long Sutton for twenty-eight years. Died suddenly in May last, leaving the widow without means.

8.—TAYLOR, HENRY. London. Age 69. A Member of the Society from 1842 to 1853. Applicant was in business on his own account at London and Godalming about eighteen years. Has a wife age 42, and two children, under 14, dependent upon him. His only means of obtaining a living is by acting as locum tenens and occasional assistance from a son in Australia.

9.—WAVELL, JOHN. Age 65. Ryde. A Member of the Society from 1853 to 1878, and a subscriber to the Benevolent Fund. Also Local Secretary for some years. Was in business at Ryde for thirty years. Is now paralysed.

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EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 1st, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely.*

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 25th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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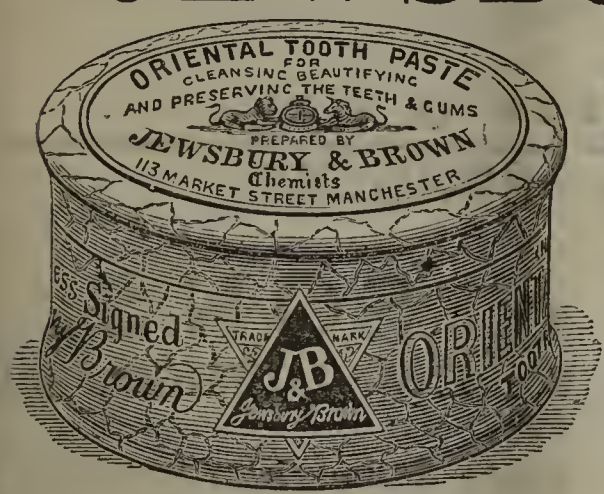

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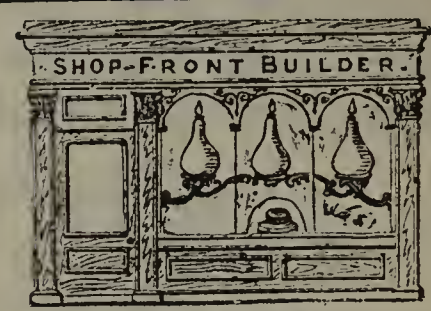

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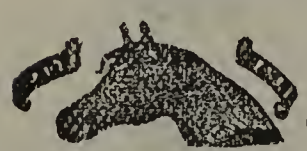

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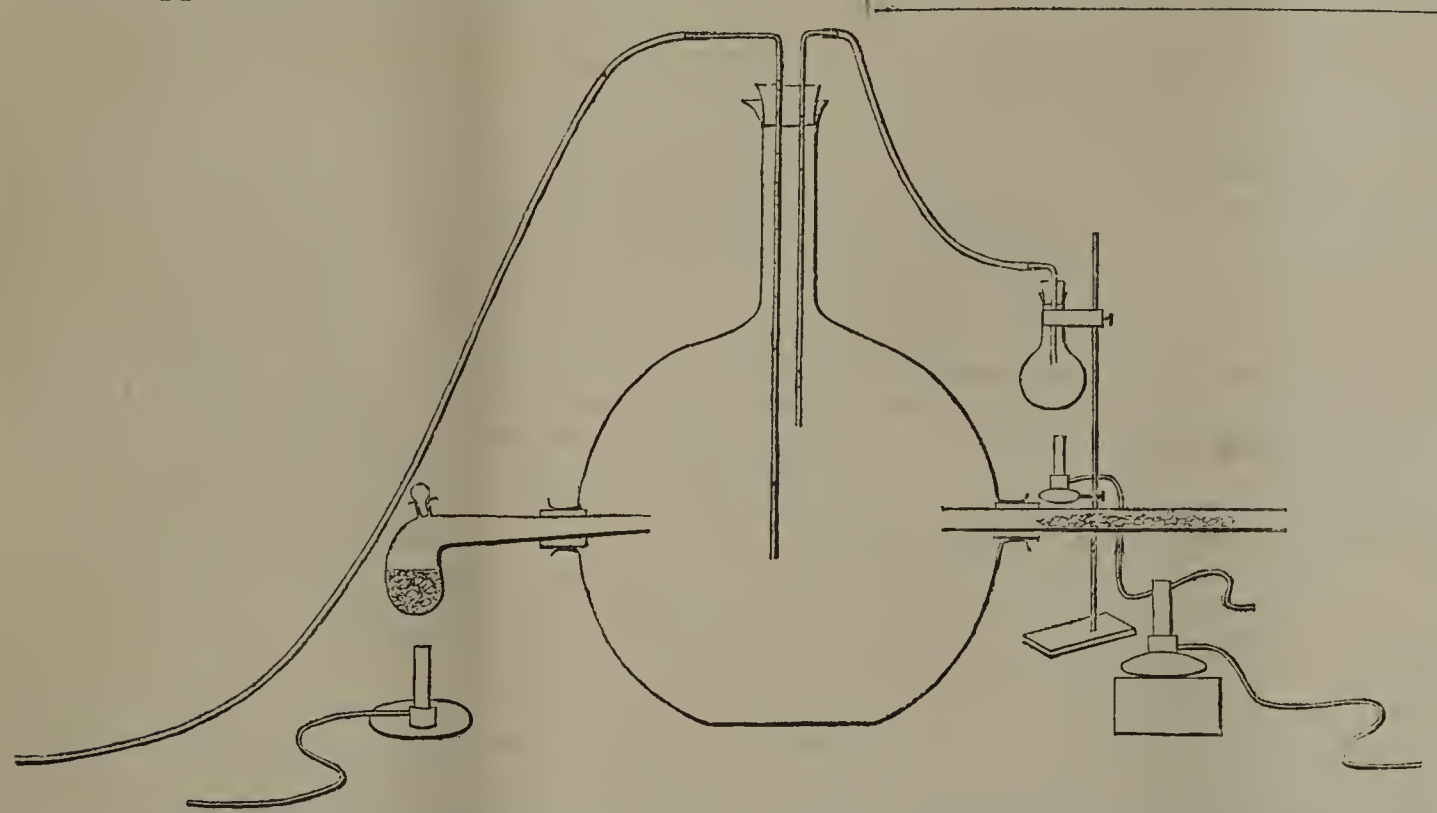
AN IMPROVED APPARATUS FOR ILLUSTRATING THE MANUFACTURE OF SULPHURIC ACID.

BY ALFRED SENIER,

Lecturer on Chemistry in St. John's Training College, Battersea.

The forms of apparatus described in chemical works for the purpose of illustrating the sulphuric acid manufacture experimentally very generally involve the logical error of taking the full quantity of sulphuric acid to begin with. This is to be avoided for educational reasons. There are, however, some exceptions to this general rule, and notably the apparatus recommended by Roscoe and Schorlemmer,* in which they employ sulphur burned in a current of air as the source of sulphurous anhydride. The apparatus here suggested is simpler and more easily constructed than that of Roscoe and Schorlemmer, and employs burning sulphur as a source of sulphurous anhydride. While, therefore, it is to be preferred to the best form of apparatus hitherto suggested, it is an important advance upon the methods generally recommended and employed in teaching. I have myself used the apparatus for several years.

The following drawing illustrates, in outline, the form of apparatus which I employ:—



Through a cork in one neck of the flask (of about a gallon capacity) is passed the neck of a small retort, containing nitre and sulphuric acid; through a similar cork in the opposite neck is passed one end of a piece of combustion tube, containing fragments of sulphur, and open at both ends; through the cork at the mouth of the flask are passed two tubes, one connected with a small flask, in which water is boiled, and the other connected with an aspirator,—preferably a gasholder full of water. Some of the sulphur in the combustion tube is heated to just above its melting point, when it ignites on a gentle current of air being caused to flow over the sulphur into the flask by means of the aspirator. Once started, the sulphur continues to burn by the heat of its own combustion, so long as the current of air is maintained. If it is wanted to introduce air it can be done easily without an extra tube, by stopping the aspirator a minute, when the burning sulphur is extinguished, and cooling below its ignition point, a flow of air passes over it through the combustion tube when the aspirator is again turned on. The sulphur can again be raised to the ignition point by momentary application of the Bunsen flame. In other respects, the mode of working is sufficiently obvious.

* 'Treatise on Chemistry,' vol. i., 322.

THE EXAMINATION OF BALSAM OF PERU.*

BY O. SCHLICKUM.

The author reports the results of a number of experiments having for their object the facilitating of the examination of balsam of peru for adulterants and the quantitative determination of these when present. As materials he used five guaranteed samples of balsam obtained at different times from different sources. The possible adulterants particularly investigated were castor oil, copaiba balsam, purified storax, an alcoholic solution of benzoin brought to the consistence of a balsam, and a similar solution of colophony. Before proceeding to methods of investigation the author makes the following remarks on the specific gravity and the free acids of peru balsam.

The specific gravity is a very important criterion of unsophisticated balsam. All the other substances above mentioned possess a lower specific gravity than the true peru balsam. The highest of the five specimens examined by the author was 1·148 and the lowest 1·142. Any sample of peru balsam having a specific gravity lower than 1·135 may therefore be regarded as adulterated. The specific gravity of castor oil and of copaiba balsam is in each case under 1·00, that of the former varying between 0·95 and 0·97, and that of the latter between 0·94 and 0·99. The specific gravity of the purified storax, which was obtained as a brown transparent balsam by extracting liquid storax with alcoholic ether and evaporating the clear filtrate, was determined as 1·090; that of the colophony solution as 1·016; and that of the benzoin solution as 1·080. These are all considerably below the specific gravity of the true peru balsam, so that an addition of one of them would markedly lower its specific gravity. For instance, an addition of 15 per cent. of benzoin solution to peru balsam, specific gravity 1·146, lowered the specific gravity to 1·135. The author prefers to use the pycnometer in determining the specific gravity of the balsam. The plan recommended by Hager, of observing whether a drop of balsam floats or sinks in a saline solution of known density, he considers to be defective, as the behaviour of the drop is affected by the conditions under which it reaches the surface of the solution.

The author does not consider that the estimation of the free acid constitutes such a good criterion as the specific gravity. The five genuine samples of peru

* Abstract of a paper in the *Archiv der Pharmacie*, [3], xx., 498.

balsam required from 5·1 to 7·2 per cent. of soda crystals for their exact neutralization. The purified storax corresponded to 4·5 to 5·1 per cent.; the copaiba balsam to 5·1 per cent.; the colophony solution to 7·5 per cent.; the benzoin solution to 14 per cent. of soda; only the castor oil was devoid of free acid. The estimation of free acid would therefore only be of use in conjunction with other tests, chiefly in the determination of admixture with benzoin or castor oil, the former increasing and the latter diminishing the acidity.

A. Behaviour of Balsam of Tolu towards Solvents.

(1). Spirit of wine dissolves half its weight of peru balsam almost clear; a further addition of spirit, however, renders the solution turbid, through separation of a small quantity of resin. Ether behaves similarly; it mixes clear with an equal quantity of balsam, but the solution becomes turbid upon the addition of more ether, resin separating equal to about 6 per cent. of the peru balsam.

As ether and alcohol easily form clear solutions with both castor oil and the colophony solution, they do not furnish a means for detecting admixtures of these substances. Purified storax and copaiba balsam give with alcohol very turbid and with ether clear solutions; benzoin solution mixes clear with alcohol, and turbid with ether, about 10 per cent. of resin separating. Consequently these solvents give no decisive indication of adulteration of peru balsam with the last three substances.

(2). Carbon bisulphide dissolves peru balsam with the exception of 11 to 16 per cent. of resin, which adheres so fast to the sides of the vessel that the light coloured solution can be poured off clear. Benzoin resin is almost insoluble in carbon bisulphide, giving up only the benzoic acid present, so that carbon bisulphide furnishes a good means for detecting a large admixture of benzoin. The following table shows the behaviour of one part of the substance tested in two parts of carbon bisulphide.

One part of	In two parts of Carbon Bisulphide.
Peru balsam	At most 16 per cent. of resinous residue. The genuine samples varied from 11 to 16 per cent.
Purified storax . . .	Dissolved completely; clear solution.
Colophony solution . .	Entirely soluble; perfectly clear.
Copaiba balsam . . .	Dissolved completely; quite clear.
Castor oil	Dissolved completely; quite clear.
Benzoin solution . .	60 per cent. of resinous residue.

Consequently if a sample of peru balsam, when shaken with double its weight of carbon bisulphide, yields more than 16 per cent. of undissolved resinous residue, an admixture of solution of benzoin is probable.

(3). Petroleum spirit takes up from peru balsam a light yellowish balsam, probably consisting principally of cinnamein (benzyl cinnamate). Upon saponifying this with alcoholic solution of caustic soda, besides sodium cinnamate, benzyl alcohol is obtained, easily recognized by its intense hyacinth odour. By repeatedly shaking peru balsam with three or four times its quantity of petroleum spirit half of it is dissolved and half remains undissolved. The following shows the relative behaviour of the other substances:—

	Shaken with Petroleum Spirit.
Peru balsam	Half dissolved.
Purified storax . . .	About one-third dissolved.
Benzoin solution . .	Only 12 per cent. dissolved.
Colophony solution . .	More than half dissolved (40 per cent. of resin).
Copaiba balsam . . .	All dissolved.
Castor oil	All dissolved.

Consequently if a sample of balsam gives up more than 50 per cent. to petroleum spirit an admixture of copaiba balsam or castor oil is indicated.

B. Behaviour of Peru Balsam towards Caustic Lime.

When peru balsam is mixed with dried calcic hydrate, no saponification or decomposition of the cinnamein contained in it results; neither does this take place if water or alcohol be added. The cinnamein can be extracted from the mixture by means of petroleum spirit, and in a large number of experiments with peru balsam the proportion was found to remain constant at 41 per cent. of the balsam used. From the residue undissolved by petroleum spirit ether dissolves out about 14 per cent. of styracin, which differs from cinnamein in being difficultly soluble in cold alcohol, and in yielding upon saponification with alcoholic soda solution not benzyl alcohol, but cinnamyl alcohol, together with sodium cinnamate.

Purified storax behaves similarly, but gives up somewhat less cinnamein to petroleum spirit and about as much more styracin to ether. Colophony and benzoin solutions, when macerated with calcic hydrate, combine with it so that petroleum spirit extracts scarcely anything from the mass. On the other hand castor oil can be completely removed with petroleum spirit as long as there has been no addition of water; but if castor oil be digested in a water-bath for several hours with calcic hydrate and successive additions of water, saponification takes place, and petroleum spirit no longer dissolves out oil from the mass. Copaiba balsam behaves similarly, its resin eventually combining with the lime, after which petroleum spirit only dissolves out the essential oil of the balsam.

After several hours' digestion with caustic lime and water, petroleum spirit removes from—

Peru balsam	41 per cent.
Purified storax.	35 per cent.
Copaiba balsam	Its essential oil.
Castor oil	Almost nothing.
Benzoin solution	Almost nothing.
Colophony solution	Almost nothing.

This method is not very suitable for the recognition of the substances used for sophistication, but it is of great value in their quantitative determination.

C. Behaviour of Peru Balsam towards Caustic Ammonia

When an ethereal solution of peru balsam is shaken with ammonia solution, sp. gr. 0·960, two yellowish-brown layers are formed, between which brownish flocks swim. The upper layer is the ethereal solution of the balsam, and leaves when separated and evaporated about 80 per cent. of the quantity used as a brown balsam. The inconsiderable resinous mass swimming between the two layers adheres partially to the side of the vessel. The lower ammoniacal layer, when separated and rendered acid with acetic acid, shows a whitish turbidity, but becomes almost clear on boiling and again turbid on cooling through separation of cinnamic acid, without, however, forming a solid deposit at the bottom. The ammonia solution withdraws the free cinnamic acid from the balsam, without affecting its other constituents.

Benzoin solution behaves similarly. It gives up to the ethereal layer the greater part of its resin, whilst the watery layer takes up the benzoic acid, and upon supersaturation with acetic acid and boiling becomes only slightly turbid.

Castor oil passes so completely into the upper ethereal layer that the ammoniacal layer upon being acidified scarcely separates a single oil globule.

In the case of colophony solution and copaiba balsam the resin combines with the ammonia, so that when the lower layer is rendered acid and boiled a considerable separation of solid resin takes place.

With purified storax there is scarcely any separation into two layers, but it yields a stiff homogeneous jelly that will hardly flow from the glass.

This holds nearly good for a mixture of equal quantities of peru balsam and purified storax; if less storax be present there is a separation into layers, but gelatinous lumps are to be seen swimming in the ethereal solution. Whilst also with pure peru balsam the lower ammoniacal layer, when separated and supersaturated with acetic

acid, appears only slightly turbid upon boiling, the lower liquid layer from a balsam adulterated with copaiba balsam or colophony, when similarly treated, shows a separation of more or less solid resin.

D. Action of Strong Sulphuric Acid on Balsam of Peru.

If peru balsam be mixed with at least an equal quantity of concentrated sulphuric acid, the mass becomes hot, blackened and thickened. Upon washing it with hot and afterwards with cold water, it is at first plastic, but after cooling becomes solid and brittle. If it be spread out smooth, dried superficially with blotting paper, crushed and placed in a test tube with several times its quantity of ether, complete solution takes place in a short time. When a small quantity (1 to 2 grams) of peru balsam is used no smell or frothing or evolution of vapour is observed when the mixing takes place; but with larger quantities these phenomena are manifested, sulphurous acid being set free. When the test is used with the adulterants mentioned, their behaviour in small quantities—1 gram—exactly resembles that of genuine peru balsam; except in the case of copaiba balsam with which, even in the smallest quantity, there is strong frothing and an evolution of white vapour and sulphurous acid. With colophony, benzoin, storax and castor oil these appearances are first manifested with a quantity exceeding 2 grams. Consequently, if frothing and evolution of sulphurous acid commences when the quantity is limited to 1 gram, the presence of copaiba balsam may be concluded.

The washed resinous mass is completely soluble in ether, as before mentioned, so long as it contains neither benzoin nor storax. But if only a small quantity has been taken for the experiments, so that no reduction of sulphuric acid has taken place (1 gram of balsam and 1 gram concentrated sulphuric acid), a sample containing storax or benzoin yields a mass that when washed and superficially dried is only partially soluble in ether. Upon mixing 1 gram of substance with 1 gram of concentrated sulphuric acid, and subsequently washing with hot and afterwards with cold water, there was obtained with peru balsam, copaiba balsam, or colophony, a solid brittle mass completely soluble in ether; with purified storax or benzoin a solid brittle mass, only partially soluble in ether; and with castor oil a smeary greasy mass completely soluble in ether.

The smeary property which castor oil imparts to the sulphuric resinous mass indicates with certainty the presence of this oil. In the case of all the other substances the washed residue possessed a plastic or even crumbling character, and became quite hard on cooling.

If the insoluble residue be well washed on a filter with ether and then treated with alcohol any portion of it derived from benzoin dissolves completely. If it owes its origin to storax a small white residue is left, consisting of a substance first observed by the author in 1881 and which E. Mylius has named styrogenin, and represented by the formula $C_{26}H_{40}O_3$. Styrogenin is still better isolated by treating the residue left by ether with acetone, which dissolves any portion of the residue derived from benzoin completely and that from storax all except the styrogenin. Styrogenin is insoluble in water, alcohol, acetone and alkalies, but is easily soluble in chloroform. It can therefore be readily got pure by treating with a little chloroform the white powder left after washing the ether residue with acetone or spirit, and allowing the chloroformic solution to evaporate in a watch glass. The styrogenin is thus obtained in microscopic crystals partly tabular and partly more pointed, but always prismatic.

If larger quantities of storax be used no styrogenin is obtained, since the reduction of the sulphuric acid thus set up involves the decomposition of the storax in other ways. But with quantities not exceeding 1 to 2 grams storax always yielded the author styrogenin. It is also requisite that the quantity of sulphuric acid used should not be less than that of the balsam. Storax yields from 6 to 7 per cent. of styrogenin.

If therefore a sample of peru balsam treated with sulphuric acid is not entirely soluble in ether, the residue if completely soluble in acetone or alcohol indicates an adulteration with benzoin; but if a white powder insoluble in acetone or alcohol be left, it shows an adulteration with storax. This powder may then be dissolved in chloroform and left to crystallize.

Scheme for the Qualitative Examination of Balsam of Peru.

(1). The specific gravity should be determined. It should never fall below 1·135.

(2). Upon shaking 1 gram of balsam three or four times with several grams of petroleum spirit, not more than 0·5 gram should be taken up, so as to be left behind upon evaporation. Otherwise an admixture of castor oil or copaiba balsam would be probable. The latter would be recognizable by the odour of the essential oil.

(3). Dissolve 1 gram of balsam in several grams of carbon bisulphide and estimate the undissolved portion, dried at 140° C. This should not amount to more than 0·16 gram, otherwise an admixture of benzoin is probable.

(4) *a.* Mix 1 gram of balsam with 1 to 1·2 gram of concentrated sulphuric acid. If frothing and a smell of burning sulphur be observed an admixture of copaiba balsam is probable. (Confirm by tests 2 and 5.)

b. After the mixture has cooled wash it first with hot and then with cold water. The residue should be at first plastic and afterwards hard and brittle. A smeary character indicates an admixture with castor oil. (Confirm by test 2.)

c. Dry the washed resinous mass superficially with blotting paper and dissolve it in several grams of ether. It should dissolve completely; if an insoluble residue be left it indicates an admixture of benzoin or storax. Treat this insoluble residue with strong alcohol, or preferably with acetone. If it dissolves completely, the adulterant is benzoin, in cases where carbon bisulphide leaves more than 16 per cent. of the balsam undissolved (test 3). If after treatment with alcohol (or acetone) there remains a white powder, easily soluble in chloroform and separating in microscopic crystals upon evaporation of the solvent, storax is present. (Confirm bv test 5.)

(5). Dissolve 1 gram of balsam in 3 grams of ammonia solution, specific gravity ·960. No gelatinization of the mixture should take place, or appearance of gelatinous fragments swimming in the ethereal layer; otherwise storax is present. (Confirm by test 4.) The mixture should separate readily into two layers, the lower of which when separated, supersaturated with acetic acid and heated to boiling, should only present a slight turbidity. The separation of solid resin shows copaiba balsam or colophony. The former gives the reaction mentioned under test 4; further, the extract obtained by evaporation of the petroleum spirit solution (test 2) has clearly the smell of oil of copaiba, whilst a colophony residue has no special odour.

Quantitative Estimation of Adulterants.

(1). Estimation of Benzoin Admixture.

a. An admixture of solution of benzoin increases the amount insoluble in carbon bisulphide, which in the case of genuine peru balsam was never found by the author to exceed 16 per cent., to the extent of the whole of the benzoin resin, exclusive of the benzoic acid by which it is accompanied, and this may be used as the basis of one method of estimating the extent of adulteration with benzoin.

Example.—1 gram of a mixture of equal parts of peru balsam and an alcoholic solution of benzoin containing 75 per cent. of resin, when treated with carbon bisulphide, left a residue which, dried at 100° C., weighed 0·38 gram.

Of this 0·08 gram is reckoned as belonging to the half gram of peru balsam and the remaining 0·30 gram as the amount of resin in the half gram of benzoin solution.

b. A second method of estimating added benzoin is based upon the amount of residue insoluble in ether after the sample of balsam has been heated with sulphuric acid. The undissolved residue amounts to about half the benzoin resin or one-third of the benzoin solution.

Example.—1 gram of a peru balsam containing 14 per cent. of benzoin solution, after treatment with sulphuric acid, left a residue of 0·05 gram insoluble in ether, which represented 10 per cent. of benzoin.

c. The direct estimation of the peru balsam in a sample adulterated with benzoin may be effected by repeatedly shaking it with petroleum spirit, which dissolves out nearly half the peru balsam as well as the benzoic acid of the benzoin. If 1 gram of the balsam be mixed with 0·30 gram of calcic hydrate and allowed to stand an hour the petroleum spirit then dissolves only 41 per cent. of the balsam of peru present, so that the quantity of this may easily be calculated.

Example.—From a balsam mixed with 14 per cent. of benzoin solution, after maceration with calcic hydrate, petroleum spirit dissolved 35 per cent. (cinnamein), which, according to the proportion $41 : 100 = 35 : x$, indicated 85 per cent. of peru balsam.

(2). Estimation of Admixture of Purified Storax.

As purified storax consists, like peru balsam, mainly of styracin, cinnamein and cinnamic acid, though with a greater preponderance of styracin, the estimation of added storax is difficult, and can only be effected by preparation of the crystalline styrogenin as before described. The quantity of styrogenin left after evaporation of the chloroform amounts to about 7 per cent. of the storax present in the balsam.

Example.—1 gram of a mixture of equal parts of peru balsam and purified storax yielded 0·04 gram of styrogenin.

(3). Estimation of Admixture of Colophony.

a. The direct estimation of colophony is effected by shaking the ethereal solution of balsam with ammonia solution, sp. gr. ·960, as before described, and separating the resin taken up by supersaturating with an acid. The solid resin dried at 100° C. amounts to seven-eighths of the colophony present.

Example.—One gram of balsam mixed with 23 per cent. of a 60 per cent. solution of colophony yielded 0·115 gram of solid resin from the ammoniacal layer of liquid.

b. The direct estimation of the peru balsam present may be made by macerating the sample with caustic lime and exhausting with petroleum, as in the estimation of benzoin.

Example.—1 gram of balsam containing 23 per cent. of solution of colophony, macerated with caustic lime, gave up to petroleum spirit 0·32 gram (cinnamein), corresponding, according to the proportion, 41 : 100, to 0·78 gram of peru balsam.

(4). Estimation of Admixture of Castor Oil.

The author was unable to accomplish the direct estimation of the castor oil, being unable to separate it from the balsam by any suitable solvent; nor was he more successful in saponifying it with an alcoholic solution of an alkali. An attempt was also made to remove the oil from the resinous mass resulting from treatment with sulphuric acid, but it was found that the castor oil was so much decomposed by the strong acid as to be no longer soluble in petroleum spirit.

a. The amount of admixture may, however, be estimated by first ascertaining the amount of cinnamein and castor oil dissolved out by petroleum spirit, and then the amount of cinnamein alone. 1 gram of the mixture of balsam and castor oil is first macerated for an hour with 0·30 gram of caustic lime, without the addition of water, and then exhausted with petroleum spirit, which dissolves the cinnamein (41 per cent.) of the balsam together with all the castor oil. A second quantity, with the addition of water, is macerated in a water-bath for several hours, by which the saponification of the oil, but not of the balsam, is induced. Petroleum spirit then dissolves only the cinnamein of the balsam. The difference in the two results gives the amount of castor oil, whilst the quantity of peru balsam can be easily calculated from the cinnamein. Of course the exactitude of the result is dependent upon the complete saponification of the oil.

b. A more simple plan is to exhaust the sample by three or four shakings with petroleum spirit, and then to estimate the soluble constituents by evaporating the solution, and the insoluble by drying the residue. The former include nearly one-half of the peru balsam together with castor oil; the latter more than one-half of the peru balsam present. By subtracting the amount undissolved from that dissolved an approximation to the quantity of castor oil is obtained.

Example.—1 gram of balsam containing 23 per cent. of added castor oil, left after four shakings with petroleum spirit 0·40 gram undissolved, which indicated approximately 80 per cent. of peru balsam. The petroleum spirit left upon evaporation 0·60 gram of oily residue, which quantity indicated somewhat more than 20 per cent. of castor oil ($0·60 - 0·40 = 0·20$).

(5). Estimation of Admixture of Copaiba Balsam.

a. The proportion of peru balsam is estimated directly by digesting the sample for several hours with caustic lime and water, exhausting the mass completely with petroleum spirit and leaving the filtered liquid to evaporate. In this way there is at first obtained 41 per cent. of the peru balsam, together with the essential oil of copaiba. To volatilize the latter the residue is heated in a water-bath until it no longer perceptibly loses weight. What is now left represents 41 per cent. of peru balsam, whilst the loss in weight gives the amount of essential oil of copaiba.

b. The amount of copaiba resin is found by means of the caustic ammonia test, as described for colophony. If to this be added the amount of essential oil, as obtained in the preceding experiment, the total will represent the amount of copaiba balsam present.

Example.—One gram of peru balsam containing 30 per cent. of added copaiba balsam after being digested with lime and water gave up to petroleum spirit 0·38 gram, which in the water-bath decreased to 0·27 gram, representing 0·11 gram of essential oil. The 0·27 gram of residue indicated 66 per cent. of peru balsam. (41 : 100.) One gram of the same sample gave when treated with ammonia solution 0·17 gram of solid resin, which added to the 0·11 gram of essential oil made a total of 0·28 gram, or 28 per cent. of copaiba balsam.

b. A more simple and sufficiently exact method is to shake the sample repeatedly with petroleum spirit, and to weigh the undissolved portion after drying at 100° C., and the dissolved portion after evaporation of the spirit at the ordinary temperature. The undissolved portion amounts to a good half of the peru balsam, and by subtracting the amount from that of the evaporation residue, an approximation to the quantity of copaiba balsam is obtained.

Example.—One gram of peru balsam containing 30 per cent. of added peru balsam left after shaking with petroleum spirit 0·35 gram undissolved, or equal to 70 per cent. of peru balsam. The petroleum spirit left upon evaporation 0·65 gram. Consequently $0·65 - 0·35 = 30$ gram (30 per cent.) of copaiba balsam.

PRECIPITATES IN FLUID EXTRACTS.*

BY J. U. LLOYD.

In considering the formation of precipitates or sediments in fluid extracts and tinctures, I have previously presented a line of experiments to show that, to a greater or less extent, they result from the mixing of various solutions whereby a new solvent is formed, and which is incapable of retaining in solution the matters extracted from the crude material by each section of the original percolate, hence a line of precipitates. As this act of precipitation progresses, the solvent power of the menstruum changes, in consequence of deposition of material which formed a part of the previous liquid; therefore the deposition of one precipitate led to the formation of others. If this phase alone were to be considered, after a certain length of time, varying perhaps from months to years, the menstruum would arrive at a point where it could hold in solution all of the material then dissolved, and at this point the act of precipitation would cease. This view of the case must be accepted, even if we assume that none of the constituents in solution are soluble, after purification in the original menstruum; for, after a certain time under such conditions, a pure menstruum would remain, and all of the dissolved matter would have settled to the bottom of the vessel.

Now we know that this point is never reached. Fluid extracts and tinctures often precipitate to a very great extent, and sometimes become much lighter in colour, but never reach a point where all of the dissolved matters become insoluble. Upon the other hand, under ordinary conditions, changes usually follow as long as we may keep a specimen of fluid extract, and the result of these changes is a continuous precipitation. In taking up this phase of the subject, it may seem that the two preceding statements contradict each other. However, such is not the case, for continuous precipitation may be taking place without depleting the liquid of dissolved matters, and may continue for an indefinite period. Let me introduce the proposition with the following experiment, which, although apparently foreign to our subject, will illustrate phenomena which follow with the tinctures and fluid extracts upon our shelves.

Into a glass vial from six to twelve inches in length and an inch in diameter, pour distilled water until it is half filled, then finish filling the tube with simple syrup. The mixture at first will not be transparent, owing to the different refractive power of the mixture of liquids; after a time, however, the liquid appears homogeneous and transparent, and is apparently uniform, a diluted syrup. Place the tube near a warm stove, or hang it against a hot steam-pipe, and in a few moments the liquid will have divided into several sections by what appear to be sharp planes.† These planes of division resemble the plane which divides a layer of chloroform from a layer of water, and are fully as sharply defined, but the refraction of light from the surfaces of the upper and lower liquids is not as great. To observe the lines of division most readily place the eye on a level with the tube, and gradually raise or lower the head so as to bring the edges of the planes one after another before the eye, when sharp distinct lines will appear. If the eye be just above or just below the edge of the plane, a reflection from its surface will become apparent and which resembles the aforenamed reflection from the contact surfaces of chloroform and water. These divisions remain for some time, often for days, dependent upon the diameter and length of tube, difference in gravity and viscosity of the liquids and the heat to which the tube is subjected.*

Let us examine more closely the contents of the tube while heat is being applied, and during which the planes to which I have referred are distinct. If the solutions are transparent and the heat regular, the observer will not be able to detect a trace of motion. The lines which are the edges of the planes of demarcation will steadily hold their position as though fixed on the glass, and the liquid between the lines will appear to be at rest. These conclusions are erroneous, however, for the planes are gradually shifting their positions, and from time to time will severally disappear, to be succeeded by others, and the liquid within the tube is in rapid motion.

If the experimenter will scatter over the surface of the liquid a few particles of some finely divided powder, which is insoluble in the liquid, each particle will settle with a steady motion until it strikes the upper plane, where the downward motion will experience more or less of a check, as though it had struck some obstruction; then it will pass through the second section of liquid with decreased velocity. Upon reaching the second dividing plane another arrest in the velocity of the downward motion will be experienced, and the particles will afterwards settle more slowly. This experience will be repeated with each plane and each section of the solution until the fall of the powder ceases. Now it will be found that each plane or section of liquid will have arrested certain portions of the powder. This distribution is in accordance with the gravity of the different particles of which the powder is composed; those of less density being first arrested, and others in accordance with their weight, falling until they reach a section of solution, or a plane, of their own specific gravity, and such particles as have a greater gravity than the lower stratum of solution will have reached the bottom of the tube.

Let us now consider the composition of this solution, and the changes which give rise to the formation of these planes of division and intervening sections of liquid, each of different specific gravity.† When we poured the syrup into the water, by reason of its greater gravity a portion of it settled to the bottom and formed a layer of syrup. Other portions become more or less mixed with water, and, in accordance with the gravity of each mixture, arranged themselves over the syrup. This selection of position continued, the upper portion of the tube containing nearly pure water. In a short time the act of diffusion had blended the points of contact between the various solutions, giving to the contents of the tube the appearance of a homogeneous liquid. When heat was applied to one side of the tube, expansion of the liquid next to that side resulted. Each portion of the liquid next the heated side of the tube started upward, but, excepting more or less of the top of the liquid, each heavy layer quickly reached a lighter overlying stratum through which, by reason of its greater gravity, it could not ascend.

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

† It might naturally be supposed, that when the heat is applied to one side of the length of a tube under the conditions named, there would be one upward current of fluid would result along the entire side next to the heat. If this were the case, in a few moments the entire contents of the tube would be a uniform mixture. Such is not the result, however, and in consequence much time is necessary to effect this end. On a larger scale, but following the same principle, we have oceanic and atmospheric currents, giving us the Gulf Stream and the strata (clouds) of condensed or precipitated vapour between the moving currents of air.

* By viscosity of liquids I refer to those that have little diffusive power, and which are known to form ropy and sticky solutions. Thus, under the same conditions, a heavy solution of potassium bromide will disappear much sooner than a solution even of less gravity of gum or glucose.

† I have as yet simply made the statement, that these sections are composed of different solutions, and have brought no proof to demonstrate the fact. This is self-evident, however, although it is but just for me to say that these sections have been examined severally at different times, and invariably there is an increase of solid matter in solution as we progress from the surface downward. The following example illustrates this fact, a tube containing a dense solution of sodium chloride overlaid by distilled water having been submitted to a one-sided heat until it had formed five zones. Upon removing 1 c.c. from each zone, the proportion of sodium chloride was as follows:—

No. 1 (top), 0·24 gr.; No. 2, 0·73 gr.; No. 3, 2·37 grs.; No. 4, 3·97 grs.; No. 5, 4·44 grs.

Hence at intervals the top of each stratum of this current ceased to rise, but owing to the upward pressure of the current beneath it was crowded away from the side of the tube and into the cool solution beyond. The deficiency occasioned by this upward current was supplied from the lower part of each section of liquid, and quickly we had a circulation of liquid, Each of these eddies continued to increase in a horizontal direction, but remained bounded by nearly the same planes above and below. Finally the entire tube was filled with eddies each of less specific gravity than the one below.

When we dropped the powder on the surface of the liquid within the tube, each particle descended in the manner before explained, until it reached a section of solution nearly of its own specific gravity, where its fall was arrested. Not so the motion, however, for each particle of powder circulated with the liquid within which it was retained, thus showing us exactly the movement of each section of solution within the tube.* This movement will continue while heat is being applied, or until the entire liquid within the tube is of the same composition, and then the solution as one body will circulate from the bottom to the top of the tube.

The experiment which I have described, and which all can verify easily, is typical of the motion which always results when heat is applied to liquids of different specific gravities, and if they are capable of forming a solution one with another. A variety of movements may be obtained by varying the position of the body which imparts the heat, but such variations simply result from modification of manipulation. It matters little whether the heat be applied evenly to all parts of the vessel, to the bottom, or to other sections, circulation follows, and the result is finally a uniform mixture of the liquids.†

If a tincture or a fluid extract be made by percolation, and the percolate be received in the order obtained, there will be a decrease in gravity from the bottom of the container upward. This is in consequence of the well-known fact that the denser part of the percolate passes first, and that the percolate grows less dense with more or less regularity as percolation progresses. When such a percolate is permitted to stand it will resolve itself into strata, and the liquids will mix in a manner similar to those in the experiment we have cited. The phenomenon is not so readily observed in these instances, owing to the fact that most percolates are dark in colour and will not permit the passage of light, but the collection of strata of precipitates at one or more points throughout such liquids indicates where the lines of division are to be found; and it is for the purpose of introducing these precipitates understandingly that I have briefly directed attention to the experiment with the tube of liquid, and I will now return to a more minute analysis of the changes which occur.

Under the conditions we have named, it has been shown that each solution rested upon one more dense, and where the liquids are in contact we have motion in opposite directions. The surfaces of each of these liquids appear to be in direct contact, and to move as though pressing against a solid plane, which is the line of division between them. If we magnify this apparent line, it will be found of considerable thickness, and in reality to consist of a stratum of fluid almost at rest as compared with the rapid flow of the upper and lower strata. However, it is in a state of excitement occasioned by the friction of the two opposing solutions, and is eddying and struggling as it is tormented by these contrary agents. It will be further found that portions of the upper side of this thin stratum are being constantly torn off and carried mechanically into the upper liquid; and this is true also of the lower side and the lower liquid. As the stratum is made up of a mixture of these two revolving bodies, and its existence depends upon an admixture of these liquids, it follows that whenever a portion of the stratum is detached and carried into one liquid, the result is an admixture with it of a portion of the other liquid. Inasmuch as these admixtures are constantly taking place while the circulation of the liquid continues, it follows that there is a continual handing down of the upper revolving liquid, and a handing upward of the lower. When we consider that the foregoing example is a simile of changes that are taking place throughout the entire tube with each of the other sections, we must see that at some time the liquid at the bottom and the liquid at the top of the tube will have become identical in composition. We can also see that this interchange is independent of the act of diffusion, and can only be considered a result of mechanical action, the primary agent being heat. Now if we have a liquid at the top of the tube differing from that at the bottom to such an extent that when these liquids are mixed precipitation results, it follows that wherever the liquids are interchanging in the proper manner precipitation must follow at that point.* Hence it is that I have called attention to the foregoing argument and experiments as a means of illustrating a fact connected with precipitates in tinctures and fluid extracts, which perhaps has not presented itself to many of us, but which will be often noticed after attention has been called to the matter.

(*To be continued.*)

* I speak now of a rapidly circulating solution and a precipitate near its own gravity. If the section is moving slowly and the precipitate heavy, the particles of powder will either rest upon the plane of division, or, seeking the side of the vial next the heat, in obedience to the motion of the lower part of the stratum, will adhere to the glass.

† During the past six years I have carried on a series of experiments regarding this motion of fluids, but the example I have given is all that is necessary for the subject now under consideration.

* This may be nicely illustrated by introducing at the bottom of the tube a pellet containing a decided trace of potassium ferrocyanide, and dropping on the top of the liquid a little solution of a ferric salt. The formation of a blue precipitate in some intermediate stratum shows where the two come together.

THE LACQUER INDUSTRY OF JAPAN.

BY JOHN J. QUIN,

Her Majesty's Acting Consul at Hakodate.

(*Concluded from page* 309.)

Colouring Matters used.

Shu (vermilion).—For red lacquer, used also mixed with gold dust for shading.

Sei-shitsu (green lacquer).—A mixture of *Kiō* (chrome yellow) and *Bero-ai* (Prussian blue).

Muras-aki-ko (purple powder).—A mixture of white lead and *Tō-beni* (*Magenta roseine*).

Benigara (red oxide of iron).—Sometimes used instead of vermilion.

In the district of Aidzu the light colours are produced to the greatest perfection, viz., yellow, green, and intermediate shades. In Tôkiô, though the same materials are used, the resulting colours are inferior and darker. In Aidzu no after polishing takes place with coloured lacquers. The lacquer is applied like paint. Tôkiô is, however, best for black lacquer, as well as for such high-class red, etc., as are polished afterwards. These differences are attributed to some climatic influence.

The *Kioto*, so called "black lacquer," shows a reddish-brown tinge. With the exception of Tôkiô, Kioto, Osaka, Kaga, Tsugaru, Wakasa, Nagova, Suruga, and Shidzuoka, and one or two isolated places, the method of smoothing with charcoal and afterwards polishing is not pursued. In Tsugaru and Wakasa neither flat nor raised gold lacquer is manufactured.

It should be mentioned that the plain lacquered articles are almost exclusively manufactured by one set of workmen, who supply the workers in gold lacquer with the articles ready for the application of the gold powdering, various patterns, etc.

The wholesale lacquer trade is in the hands of a few large merchants. In Tôkiô there are two houses only. ahese receive the crude lacquer from the producers as it rrives from the various districts, either buying it outright or making advances to the contractors, who are bound by the rules of the guild to deliver only to them. They sell it in quantities as required to the lacquer manufacturers, who prepare and refine the sap for the market, and these again retail the material to the lacquer workers. The various processes that the lacquer undergoes in the hands of the manufacturers before retailing are kept secret, only the approximate mixtures being known.

That all lacquer, even that sold as pure lacquer, undergoes some adulteration, is rendered evident from the fact that, in accordance with a strange custom peculiar to the lacquer trade, the retail manufacturers sell even the smallest quantity at the same rate at which they buy it from the wholesale merchant.

Among the Tools and Materials used in the Manufacture of Gold Lacquer, are—

Neji-fude.—Brushes made of rats' hair, used for tracing out the patterns, and for drawing the very fine lines, etc. The best are made of the long hairs from the backs of "ship rats," whose fur is not so likely to get rubbed.

U-no-ke-usuji-fude (fine brushes made of hares' hair).—These are a little larger than rats' hair brushes, and are used for filling in the patterns of the best articles, also for drawing outlines on common articles and ground work. There are two sizes, *Dai* and *Sho*, used for drawing "large" and "small." There are besides five sizes of *Ji nuri fude* (grounding brushes).

U no-ke-hake (a flat brush made of hares' hair, used for spreading the lacquer on large pieces of work).—There are two sizes used.

Men-sō (a stiff brush made of deer's hair, used for applying the *Sabi*, etc., in making raised gold lacquer).—It is only used for stiff mixtures.

Hakè (flat brushes of human hair, for smoothing the lacquer after application, as in ordinary plain lacquer).—There are two sizes used.

Bun-mawashi (compass with fine brush attached for describing circles).

Kè-bo (brushes made from the long body hairs of a horse, used for smoothing the fine gold powder and brushing off extra particles, used also for dusting).—There are four sizes.

Fude-arai (brush cleaner, made either of ivory or tortoise shell).—The brushes have to be very carefully cleaned, after using, with *Sesamum orientale* oil, to remove every trace of lacquer.

Tsutsu (a quill, from the wing of a swan or crane, over one end of which is stretched a piece of silk, used for scattering the gold dust).—There are two sizes used.

For applying *Nashiji* or *Hirame* bamboo tubes of three different sizes are used, with silk of more open texture.

Saji (spoon), for putting the gold dust into the quill or bamboo tube.

Hirame-fude.—A pointed piece of bamboo or other wood, used for picking up and applying *Hirame*, or the gold, or shell squares.

Kujira-bera (whalebone spatula).—Used for mixing the materials, and also when transferring the tracing on the paper to the article to be painted (process described farther on). The kind used is called island whalebone. and comes from China; that obtained from Japan is practically useless, being liable to split. Two sizes are used.

Hera.—Spatulas made of *Hinoki* (*Chamæcyparis obtusa*), smaller than those used by workers in plain lacquer. There are three sizes used for applying plain lacquer, and three sizes for applying *Sabi*.

The Tooth of a fish, ordinarily the *Tai* (*Cerranus marginalis*), fastened with lacquer on to a piece of bamboo, used for polishing such crevices as are too small to admit of charcoal, etc., being used.

A piece of polished shell, used for smoothing the paper on which the pattern is drawn before tracing with lacquer.

Tsume-ban.—A palette, made either of tortoise shell or buffalo horn, worn on the left thumb.

Take-ban.—A small bamboo board, used when cutting the gold and silver foils into squares.

Gold and Silver Dust used for Ornamentation.

Of these there are several kinds, viz:—*Yasuri-ko* or *fun* (file powder), made in *Yaki-kin*; (pure gold) *Koban-kin* (10 parts gold to $2\frac{6}{10}$ silver); *Gin* (silver). There are twelve qualities of each differing, in fineness.

Besides these, there is an extra large kind, used for ground-work, called *Hira-me* (flat-eye). The coarsest filings, whether of pure gold, *Koban*, or silver, are taken and rolled out flat on an iron plate. Of *Hirame* there are eight kinds each.

Next comes the kind called *Nashiji*, from its resemblance, when applied to the article, to the rind of a pear. *Nashiji* is used for ground-work, in making which pure gold, also *Koban-kin* (10 parts gold, $2\frac{6}{10}$ silver), *Jiki-ban* (10 parts gold, $3\frac{1}{10}$ silver), *Nam-ban* (10 parts gold, $3\frac{6}{10}$ silver), and silver, of seven qualities of fineness each, are used.

Aka-fun (red powder) is vermilion mixed with pure gold, *Koban-kin* and silver, for shading.

Kuro-fun (black powder) is camellia charcoal powder mixed with pure gold, *Koban*, and silver.

Giyōbu nashiji is the coarsest kind of *Nashiji* made; but it is little used, as it requires seven or eight coats of lacquer to be applied before it is covered sufficiently to stand polishing.

Keshi-fun.—This is the finest kind used; it is only made in pure gold and *Koban*. This is made by mixing gold-leaf in liquid glue till it is reduced to an impalpable powder; water is then added, and when the gold sinks the liquor is poured away. This is repeated till all the glue has been got rid of.

Shaku-dō-fun.—A mixture of seven parts pure gold and three parts of copper powder.

Kana-gai.—Foil made of pure gold, *Koban*, and silver. It is made of four thicknesses in each quality, viz:—*Hon-neji*, *Chiu-neji*, *Usushu*, *Kime-tsuke*, the last being the thinnest.

Besides the above, there are several mixtures as—

Kuri-iro-fun (chestnut-coloured powder).—A mixture of one-half gold dust with powdered camellia charcoal and vermilion.

Nedzumi-iro-fun (rat-colour grey).—A mixture of half silver and powdered camellia charcoal, and a little vermilion.

In each case it is evident that several distinct shades can be obtained according as more or less colour is added to the gold and silver dust. It is a remarkable fact that (as I am informed) no vegetable colours can be used with lacquer. They are all eaten up, as it were, by the lacquer and disappear, which accounts for the very few variations seen in the colours of lacquer. The workmen have never been able to produce white, purple, or any of the more delicate shades.

Of late years, since cheap work has been introduced, the custom of using tin dust has been adopted for making common *Nashiji*, It is manufactured of the same sizes as in gold and silver, and when plenty of gamboge is mixed with the lacquer to cover it an inexperienced person might easily mistake it for gold when the ware is new, but it soon deteriorates. Burnt tin dust is also sometimes used for under coats in making cheap raised lacquer.

Mode of making Gold Lacquer.

(*a.*) *Togi-dashi* (bringing out by polishing).—The article having been subjected to the first twenty-two pro-

cesses, as described in making *Houji* (Class I.), is then treated as follows:—

The picture to be transferred to the article is drawn on thin paper, to which a coating of size made of glue and alum has been applied—that known as *Mino-gami* is best. The reverse is rubbed smooth with a polished shell or pebble, and the outline very lightly traced in lacquer, previously roasted over live charcoal to prevent its drying, with a fine brush made of rats' hair. The paper is then laid, with the lacquer side downwards on the article to be decorated, and is gently rubbed with a whalebone spatula wherever there is any tracing, and on removing the paper the impress may very faintly be perceived. To bring it out plainly, it is rubbed over very lightly with a piece of cotton wool, charged with powdered white whetstone or tin, which adheres to the lacquer. Japanese paper being peculiarly tough, upwards of twenty impressions can be taken off from one tracing, and when that is no longer possible, from the lacquer having become used up, it only requires a fresh tracing over the same paper to reproduce the design *ad infinitum*. This tracing does not dry owing to the lacquer used for the purpose having been partially roasted, as previously mentioned, and can be wiped off at any time.

The next process is to trace out the veining of the leaves, or such lines to which in the finished picture it is desired to give the most prominence, and these lines are powdered over with gold dust through a quill. The qualities called *Mijin*, *Koma-kame-mijin* and *Aragoku*, are generally used; either finer or coarser qualities cannot be used. The article is then set to dry for twenty-four hours in the damp press. The outline is now drawn carefully with a rats' hair brush over the original tracing line with a mixture of black and branch lacquer, called *Rō-sé*. The whole is then filled in with *Rō-sé* applied with a hare's hair grounding brush. Gold dust of a slightly coarser quality than *Mijin* is scattered over the lacquered portion, and the article is set to dry for twenty-four hours. Another thin coating of *Rō-sé* lacquer is again given to the gold-powdered portions, and the article set to dry for twelve hours. Next, a coat of *Rō* (black lacquer) is applied over the whole surface of the article, which is set to dry for at least three days. It is then roughly ground down with *Magnolia* charcoal, the surface dust being constantly wiped off with a damp cloth till the pattern begins to appear faintly. Another coating of *Rō* lacquer is then given and the article set to dry for thirty-six hours. It is again ground down with *Magnolia* charcoal as before, this time till the pattern comes well out. The ensuing processes are the same from 28 to 33 inclusive, as in black lacquer (*Honji* (*a*)).

In making *Togi-dashi* on hard woods, transparent lacquer is used instead of *Rō*.

(*b.*) *Hira-makiye* (flat gold lacquer).

The article having been thoroughly finished, either in black or red, etc., as already described under the head of *Honji*, Class I., and the following kinds, a tracing is applied to the surface as in *Togi-dashi*, the outline is carefully painted over with a fine brush of rat's hair, and then filled in with a hare's hair brush, using *Shitamaki* lacquer (branch laquer and red oxide of iron). Over this surface gold dust, of the quality called *Aragoku* being generally used, is scattered with a brush of horse's hair (*Kebo*) till the lacquer will not absorb any more. The article is then set to dry for twenty-four hours. A thin coating is next applied over the gold, of transparent lacquer or *Yoshino* lacquer, and set to dry for twenty-four hours at least. It is then most carefully smoothed with camellia charcoal, and finally polished off with *Tono-ko* and a little oil on the point of the finger, till the ornamented portion attains a fine polish. The veining of leaves and the painting of stamens, etc., of flowers, or such other fine work, is now done with a fine rat's hair brush charged with *Ke-uchi* lacquer over which fine gold dust (*Goku-mijin*) is scattered from a brush of horse's hair (*Kebo*) as before, and the article set to dry for twelve hours. Some *Yoshino* lacquer is then applied to a piece of cotton wool, and rubbed over the whole surface of the box or other article, and wiped off again with soft paper. It is set to dry for twelve hours, after which it is polished off with deer's-horn ashes and a trifle of oil. When very high-class work is desired, *Yoshino* lacquer, to which a little water has been added, is applied, and polished off a second time, and a very brilliant surface is attained.

More ordinary "flat gold lacquer" differs in the manufacture as follows:—The tracing is accomplished in the same manner, but *Shitamaki-nobe* lacquer (branch lacquer, red oxide of iron and camphor) is used for filling in the pattern with a hare's hair brush. The article is then set to dry in the press for ten to twenty minutes, during which time the lacquer has begun to harden, and less gold will adhere. Then gold dust (*Goku-mijin*) is applied with cotton wool thinly, and the article is set to dry for twenty-four hours. The whole surface is then smeared over with *Yoshino-nobe* lacquer (*Yoshino* lacquer and camphor) on a piece of cotton wool, and wiped off again with soft paper. The reason is that it is less trouble to smear over the whole surface thinly, and it is, moreover, not necessary to give a thick coat of lacquer to the decorated part, as the gold dust has been very thinly applied. It is set to dry for twelve hours and ground smooth with camellia charcoal and polished with powdered whetstone and oil on the point of the finger. The fine lines are then drawn with a rat's hair brush charged with *Shitamaki* lacquer, and sprinkled with gold dust (*Goku-mijin*) from a brush (*Kebo*), and the article set to dry for twelve hours. The whole is again smeared with *Yoshino-nobe* lacquer and carefully wiped off again with paper, and set to dry for twelve hours. The article is then polished with powdered whetstone and oil on the point of the finger, and a second application of *Yoshino-nobe* lacquer with a little water, wiped off with soft paper, set to dry for twelve hours, and finally polished off with deer's-horn ashes and oil on the finger, finishes the operation.

Should it be required to make any dark spots or lines, such as birds' eyes, or to draw human hair, etc., or other shading, this is done last of all with *Kuma*, "bear" lacquer, *Jō-hana*, and lampblack.

More Common Kind of Flat Gold Lacquer Painting.

Instead of tracing the design in roasted lacquer, it is done with a mixture of powdered *Tono-ko* and water, and the impression is transferred to the articles with the whalebone spatula as before. The reason for only using *Tono-ko* instead of lacquer is that the ground-work being inferior it cannot be ground or smoothed afterwards, and the edges of the pattern would not be clean, nor stand out clear, should any lacquer get smeared outside the tracing line. The outline is then filled in with *Shitamaki-nobe* lacquer with a coarse hare's hair brush, and the article is set to dry for twenty minutes, or till a thin skin has formed on the lacquer, and then the half-dry surface is wiped over with cotton wool charged with *Keshi-fun*, the finest gold powder, and set to dry for five or six hours. The whole surface is then smeared with *Yoshino-nobe* lacquer, which is carefully wiped off again with soft paper, and the article set to dry for half-a-day The surface is then rubbed over gently with deer's-horn ashes and soft paper to give it a polish, and to get rid of any of the last coat of *Yoshino-nobe* lacquer.

The fine lines are now drawn with a fine hare's hair brush charged with *Shitamaki-nobe* lacquer, and the article set to dry for twenty minutes or so; then *Keshi-fun* is applied with cotton wool, and again set to dry for five or six hours. No further process takes place.

(*c.*) *Taki-makiye* (raised gold lacquer).

The ground-work may be either black or coloured lacquer, *Nashiji* (pear basis of gold dust), or the plain wood.

The outlines of the pattern are transferred to the surface of the article in the same manner as in *Togi-dashi*, or "flat lacquer." The outline is then painted over with *Shitamaki* lacquer, and this is covered with powdered camellia charcoal. If the outside is to be higher than the inside, a broad margin is painted and covered with charcoal powder, leaving the centre untouched, and *vice versâ*; if the centre is to be higher a faint line only is painted outside, and the inside is given a thickish coating, which is sprinkled with the charcoal dust, and the article set to dry for twelve hours. When taken out of the press it is well dusted to get rid of any loose charcoal powder, and is also washed, using a brush made of human hair (*Hake*) to clean out all the crevices and bring out the lines, etc. Some *Yoshino-nobe*, or "branch lacquer," with camphor, is now rubbed on with a piece of cotton wool and carefully wiped off with soft paper, and the article set to dry for twelve hours. The raised parts are next carefully ground smooth with a piece of *Magnolia* charcoal, and a second coat of *Yoshino-nobe*, or of "branch lacquer," is applied as before and dried.

[If a well-raised pattern is required, one, two, or even three coats of *Sabi* ("branch lacquer" and *Tono-ko*) are applied, the outside edges being painted with a brush of deer's hair (*Menso*), and the inside lacquer applied with a small *Sabi* spatula, the article being set to dry between each application for twelve hours. For coarser work it is then ground smooth with a white whetstone, and for finer work with a yellow whetstone. Over this some "branch lacquer," mixed with camphor, is rubbed with cotton wool and wiped off with soft paper, and the article set to dry for twelve hours.]

If the pattern is not to be very high the operations described between the brackets are omitted. A coating of *Takamaki* lacquer is now given, the outside edges being carefully drawn with a rat's hair brush, and the inside of the pattern filled in with a hare's hair brush, and the article set to dry for thirty-six to forty-eight hours. When taken out of the press the surface is ground smooth with *Magnolia* charcoal, and then partly polished with camellia charcoal on a cotton cloth. A little oil is now rubbed on, and a further polishing takes place with powdered "whetstone" on a cloth. Next, "branch lacquer" is rubbed over the raised parts with cotton wool and wiped off with soft paper, and the article set to dry for twelve hours. It is next polished with deer's-horn ashes and a little "rape seed," or "sesamum" oil applied on the point of the finger. Up to this point the formation of the pattern, whether mountains, waves, trees, men, birds or animals, has been gradually completed.

If small squares of gold foil (known as *Kiri kane*), or of coloured shell, are used in producing the pattern, they are now applied one by one on the point of a bamboo stick (*Hirame fude*), the spot where they are to be affixed having been smeared with a little *Rō-sé* lacquer to make them adhere. When all that is required has been affixed, a piece of soft bibulous paper is spread over the freshly done parts and pressed very carefully with the finger. This is to get rid of as much of the *Rō-sé* lacquer as is not covered by the gold squares as possible; the article is set to dry for twelve hours, and then the portion where the gold has been applied is gently polished with a little camellia charcoal on the point of the finger, to get rid of the remainder of the *Rō-sé* lacquer. Shell patterns, and the coarser kinds of gold dust that may be required, are applied in the same manner. The finer kinds of gold dust are applied next, over a coat of *Shitamaki* lacquer, and the article set to dry for twelve hours. The remaining processes of polishing, drying, etc., are the same as in first-class "flat gold" lacquer.

For making raised lacquer patterns on plain wood the whole surface is covered with tin-foil, stuck on with rice paste, to keep the wood quite clean, and then the place only where the pattern is to come is cut out. In making all high-class lacquer the edges of every article are pasted over with tin-foil to prevent their being rubbed or injured by the workman, and the same is done over each portion as it is finished.

The above is the ordinary method of making best raised lacquer, but from a glance at the specimens which accompany this paper it will be seen immediately that there are such innumerable modifications of one process or another, according to the object to be produced, that it is manifestly impossible to do more than give the above cursory sketch. Nearly every piece of good lacquer made exhibits a specimen of each kind, viz, *Nashiji*, *Toga-dashi*, *Hira-makiye*, or *Taka-makiye*.

In making raised lacquer on inferior articles the methods do not vary much from the good kinds; the work is merely less carefully executed. The saving is in the quantity and quality of the gold dust used, and the absence of minute after-work, or in the use of silver and tin instead of gold dust. In the very cheapest kinds burnt tin dust is used instead of charcoal over the first coat of *Shitamaki*. This is burnished bright, and over it a thin coating of lacquer and gold dust is applied. At first it looks well, but loses its colour in a year or two. By using tin powder the same height is attained in one coat that would necessitate at least three coats of lacquer and charcoal dust. This kind of work is, however, only used for cheap articles for foreign export, and has been quite lately introduced.

(*d.*) *Lacquering on Metal.*

For lacquering on iron or copper, brass or silver, the metal is smoothed and polished, and then given a coating of "crude lacquer," or "black lacquer;" the article is put over a charcoal fire, and the lacquer is burnt on to the metal till all smoke ceases to escape. The fire must not be too fierce, and the metal must not be allowed to get red hot, or the lacquer turns to ashes. After the lacquer has burnt quite hard the surface is rubbed smooth with *Lagerstrœmia* charcoal; these operations are repeated three or four times, till a good foundation of lacquer has been obtained. Then the same operations exactly are repeated as in making best "black lacquer," *Togi-Dashi*, "flat gold lacquer," or "raised gold lacquer," only that the lacquer is burnt dry over the fire instead of being dried in the press. The lacquer is thus rendered quite hard and very durable. After the first two or three coats have been burnt on, the subsequent drying processes can be carried on in the damp press, should it be so desired.

In winter, or when any article is required in a hurry, the workmen sometimes put a charcoal fire in the press, over which a pan of hot water is placed. The steam which is thus generated helps to dry the lacquer in an hour or two, which would take twenty-four hours to harden ordinarily, but the lacquer thus dealt with loses its strength, and is never very hard. "Black lacquer" turns a rusty brown, the colouring virtue of the iron being apparently lost, and therefore this plan is never adopted for good work, and in second-rate work only for under coats.

Nashiji (pear basis).—This style of ornamentation, occupying an intermediate position between plain and ornamental lacquer, is therefore treated of last. Till the opening of Japan to foreign trade it was in the hands of workers in gold lacquer, but now for the most part all *Nashiji* on articles intended for exportation is applied by workers in plain lacquer. In making best *Nashiji*, as in *Togi-dashi*, the first twenty-two processes are identical with *Honji*, Class I. A coating of *Rō-sé* is applied, and the gold dust is sprinkled over the surface through one or other of the bamboo tubes, according to the fineness required. The article is set to dry in the press for forty-eight hours, and is then given a coating of pure transparent varnish. This is set to dry for three or four days, when it is roughly ground with *Magnolia* charcoal, and a second coat of transparent lacquer given. The article is set to dry for forty-eight hours, and then ground with *Magnolia* charcoal till a perfectly smooth surface is obtained. Transparent lacquer is then applied with a piece

of cotton wool, and wiped off again with soft paper, and the article set to dry for twenty-four hours. It is then polished with a mixture of *Tono-ko* and camellia charcoal powder and a little oil. Next, a coating of *Yoshino* lacquer is given, and wiped off with paper; the article is set to dry for twelve hours, and then it is polished with deer's horn ashes and oil. This is repeated three times to finish the article.

The same processes are gone through when using silver instead of gold dust.

For cheap qualities tin dust is used, and the powder is scattered on glue immediately above a coating of *Kanoji* (whiting and glue). When the article is dry it is burnished with *To-kusa* (*Equisetum*), and as soon as it presents a bright surface a coating of pure transparent lacquer, with gamboge, is given to it. It is set to dry for a day in the press, and ground with *Magnolia* charcoal. Over this a coating of *Shu-urushi* (transparent varnish containing oil) is applied, and another drying for twenty-four hours completes the process.

SOLUBILITY OF COMMERCIAL SULPHATES OF MORPHINE.*

BY VIRGIL COBLENTZ, PH.G.

An article on this subject appeared in this Journal, March 25, p. 798, by Professor Power, giving the conflicting statements on the solubility of sulphate of morphine, and at the same time making an accurate determination of the solubility of the salt as made by Rosengarten and Son. The object of this article is the determination of the differences in the degree of solubility of this salt as produced by different manufacturers and found in our markets. The method employed to determine the solubilities is that recommended by Professor Power, viz., "An excess of sulphate of morphine was digested with distilled water at 15° C. for several days with frequent agitation, and the solution filtered from the excess of salt (proper temperature being observed), the amount of sulphate of morphine contained therein was determined by precipitation with chloride of barium, and from the ignited amount of barium sulphate the amount of crystallized sulphate of morphine, $(C_{17}H_{19}NO_3)_2.H_2SO_4+5H_2O$, was inversely calculated."

Example.—16·363 grams of cold saturated solution gave ·2650 gram of sulphate of barium, corresponding to ·8625 gram of crystallized sulphate of morphine.

$(BaSO_4)232{\cdot}8:(C_{17}H_{19}NO_3)_2HSO_4+5H_2O)758::{\cdot}2650:x.$

$x={\cdot}8625$ gram morphine sulphate crystallized.

(Solution) 16·336 : (Morph. Sulph.) ·8628 : : 100 : x.

$x=5{\cdot}272$ per cent., and 100 : 5·272 = 18·97 parts of water.

Sample.	Weight of solution.	Weight of $BaSO_4$.	Weight of Morph. Sulph.	One part of the salt soluble at 15° C. in
I. . .	11·000 gm.	·1580 gm.	·5145 gm.	21·38 water.
II. . .	21·808 „	·2801 „	·912 „	23·90 „
III. . .	17·508 „	·232 „	·7554 „	23·18 „
IV. . .	13·020 „	·226 „	·7359 „	17·69 „
V. . .	16·363 „	·265 „	·8625 „	18·97 „
Average				21·00 „

In round numbers 1 part of this salt requires from 18 to 24 parts of water at 15° C. for solution.

SOLUBLE SACCHARATE OF IRON.†

BY DR. C. BRUNNENGRAEBER.

The author gives the following instructions for the preparation of "ferrum oxydatum saccharatum solubile," or "iron sugar" as the result of numerous experiments. The formula has been adopted for the new edition of the German Pharmacopœia.

Dissolve 9 parts of powdered sugar in 9 parts of water, and next 30 parts of solution of perchloride of iron (sp. gr. 1·280 to 1·282, containing 10 per cent. of iron); then add gradually, with stirring, a solution prepared with heat and allowed to cool of 24 parts of sodium carbonate in 48 parts of water. When the carbonic acid has been given off as completely as possible, add gradually 24 parts of soda ley (sp. gr. 1·159 to 1·163, containing 15 per cent. of NaHO), and allow the mixture to stand until it has become clear. After the addition of 9 parts of sodium bicarbonate, dilute it immediately with 600 parts of boiling water and put it aside to settle. Draw off the supernatant liquid by means of a siphon, and mix the precipitate with 400 parts of hot water. After clearing, remove the liquid and again heat the precipitate in a similar manner with another 400 parts of hot water. Then collect the precipitate upon a moistened cloth, wash it with hot water until the liquor running off, when diluted with five times its volume of water, is only rendered opalescent by silver nitrate, and press. Mix the precipitate so heated in a porcelain dish with 50 parts of powdered sugar, evaporate it to dryness in a steam-bath whilst stirring, rub it to a powder and add sufficient powdered sugar to bring the total weight of the mixture up to 100 parts.

The product should be a red-brown sweet powder, tasting of iron, containing 3 per cent. of iron, and giving with twenty times its weight of hot water a perfectly clear, red-brown, barely alkaline solution, which is not altered by potassium ferrocyanide, but upon the addition of hydrochloric acid becomes first a dirty green colour, and then a pure blue. An aqueous solution (1 in 20) first heated with excess of sulphuric acid and then cooled should only give an opalescent turbidity with silver nitrate.

THE "GLOBE" ON LICENSED POISONS.

The following editorial remarks upon the sale of patent medicines containing poisons appeared in the *Globe* of the 17th inst. The inquest referred to is reported on p. 339:—

"The vices and virtues of soothing syrup as administered to infants were again discussed yesterday at an inquest held upon the body of a child which had been only too effectually soothed by a dose of it. This medicine, if it should so be called, is sold under a Government stamp, and is therefore naturally regarded by many persons who use it as having a sort of official certificate of harmlessness. The medical evidence produced yesterday is not at all calculated to support this view of its innocuous character, or to encourge ignorant people to put much faith in the supposed warranty which such a stamp carries with it. Dr. Diplock, who has had some experience before of the fatal results produced by these syrups, explained that some of them contained ingredients which may be harmless to one child, but 'most fatal' to another; and the medical man who had conducted the *post-mortem* examination averred that the bottle out of which the dose was taken contained enough poison to destroy half-a-dozen children. There are, no doubt, different kinds of soothing syrups, more or less poisonous in their character, and there may be some which are absolutely safe when taken in reasonable doses. But these later are most unfairly discredited through the ill-fame that now justly attaches to the others, while the credit of the Government itself is seriously impugned by its stamping with what is supposed to be a guarantee bottles containing such dangerous poisons as morphia and other strong narcotics. The revenue is, of course, benefited by allowing such mixtures to be stamped and sold, and would suffer considerably if the stamp were refused to all medicines containing any poison. But the public will very generally agree with the coroner's jury yesterday in thinking that 'some restriction should be placed on the sale of medicines which can be used as poisons.' It is often difficult to ascertain whether an overdose has been given or not; but in the case investigated yesterday it seems that even an ordinary dose may have caused death."

* From the *American Journal of Pharmacy*, Sept., 1882.

† From the *Archiv der Pharmacie*.

The Pharmaceutical Journal.

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

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MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

THE Thirtieth Annual Meeting of this Association was held on September 12 to 15, at Niagara Falls, New York, and commenced under the Presidency of Professor P. W. BEDFORD; in point of attendance it would appear to have been most successful, over three hundred members and fully as many ladies having been present. The meeting on the first day was, as usual, mainly devoted to the reading of the President's Address and to the routine work of organization. We hope on a future occasion to refer more fully to some of the topics discussed in this Address, and in the meantime refer our readers to some passages quoted om it on another page. The second session saw the election of the new officers, Mr. CHARLES HEINITSH, Lancaster, Pa, being the choice for President, with Vice-Presidents from Maryland, Georgia and Rhode Island. Then there were the reports of the officers and committees; but further reference cannot be made to these here than to mention that the affairs of the Association appear to be in a most excellent and thriving condition, with a full supply in the treasury to meet all wants, and each department doing its share of the work well.

Several scientific papers were read at the second, third and fourth sessions, and were discussed at more or less length. The first paper was entitled, "Oil of Thyme of Commerce is said to be very often deprived of its Thymol. Is this Statement true?" The reply of Mr. J. L. LEMBERGER showed that from nine samples examined the yield of thymol varied widely, the lowest giving 0·42 per cent. and the highest 38·75 per cent. Only one other sample, however, contained as much as 16·67 per cent., the remainder yielding 6·67, 1·67, ·80, ·42, ·84, 7·92 per cent. respectively.

A paper by Mr. P. C. CANDIDUS gave the results of his experiments as to the solubility of officinal chemicals in dilute alcohol at 60° F., and at the boiling point. His paper can only be of service *in extenso*, as it deals entirely with figures.

Mr. G. W. KENNEDY read a paper on "The Quality of Mercurial Ointment in Commercial Use," the conclusion drawn from his investigation being that the bulk of that sold in the United States is probably bought for one-third mercury, instead of one-half, the strength ordered in the United States Pharmacopœia. Some of the samples examined had as low as 21 per cent. A few samples had nearly 50 per cent. This paper was succeeded by one on "The Manufacture of Mercurial Ointment," by Mr. EMLEN PAINTER.

Mr. J. H. FEEMSTER read a paper on "Guarana: the Percentage of Caffeine in Guarana and the Seed, the best Methods of Examination, and the best Menstruum for its Exhaustion." His experiments showed a percentage of 4·32 caffeine in guarana and 5·08 in the seed. The best method for its extraction was found to be that proposed by Professor E. S. WAYNE in 1877, the menstruum preferred being a mixture of 2 parts alcohol, and 1 part each glycerine and water (by measure).

Mr. R. H. COWDREY read a paper on "The Active Diastase in Extract of Malt." The author stated that when made and evaporated at a low temperature there was enough diastase in 1 fluid ounce of extract of malt to convert 1 ounce of starch into dextrine and sugar, but that most extracts of malt would not respond to such a test, because the diastase was injured in the evaporation by too great heat.

A paper on "Percolation, advancing some new Theories as to its *Modus operandi*" was partially read by Mr. N. ROSENWASSER, but owing to its length was referred to the Committee on Publication.

Professor P. W. BEDFORD, New York, read a paper on "The Quality of Commercial Salts of Bismuth." Six samples examined proved all to be well made, containing only traces of impurities, while as to the presence of arsenic, the quantity in 1000 grains varied from $\frac{4}{10}$ to 3 grains.

A paper on "Creasote of the Market," by the same writer, showed that the principal supply, and that which is sold chiefly in the United States, is the coal tar creasote or carbolic acid; but that the true wood creasote is to be had, and pure, without any difficulty.

Mr. WILLIAM SAUNDERS read a paper on "The Germination of Medicinal Seed." This was followed by a paper, sent by Mr. C. SPENCER, on "The Quality of Fluid Extract of Hydrastis Canadensis of the Market," showing, as judged by the analyses made, that there is considerable variation in the formulæ followed.

Professor W. T. WENTZELL furnished a paper on "Phosphoric Acid," the chief interest in which was a method for making the acid direct from phosphorus by the oxidizing influence of a moist atmosphere.

Mr. C. B. ALLAIRE read a paper on "Powdered Drugs and their Adulterations," in which he asserted that after an extensive examination he was of opinion that 40 per cent. of the drugs sold in the United States are impure.

In a paper on "Boracic Acid," Mr. E. DANA

referred to its uses, and gave formulæ for various pharmaceutical preparations. Professor E. L. PATCH presented a paper on "Gentio-Picrin," being a continuation of some investigations reported at the meeting last year; and Mr. A. CONRATH presented a paper on the "Alcoholic Strength of various Fluid Extracts," by which it appears that in commercial extracts it varies considerably from the standard of the United States Pharmacopœia. The list of papers was completed by one by Professor J. U. LLOYD on "Precipitates in Fluid Extracts," which was a continuation of his paper of last year, and one of the best contributions to the meeting.

At the third session the following gentlemen were elected honorary members:—THOMAS GREENISH, PETER SQUIRE, JOSEPH INCE, MICHAEL CARTEIGHE, and GEORGE W. SANDFORD, London; GEORGE F. SCHACHT, Clifton; RICHARD REYNOLDS, Leeds; CHRISTIAN BRUNNENGRÄBER, Rostock; CARL SCHACHT, Berlin; I. MARTENSON, St. Petersburg; and NICHOLAS SINIMBERGHI, Rome.

At the same session, Dr. W. B. CARPENTER, of London, was introduced, and delivered an address.

The social features of the meeting were exceedingly pleasant, and were well carried out by the Committee of Entertainment. The next annual meeting will be held in Washington, D.C., on the second Tuesday of September, 1883.

SIEMENS'S ELECTRIC FURNACE.

DR. C. W. SIEMENS and Professor A. K. HUNTINGTON read an interesting paper before Section B of the British Association, during the Southampton meeting, detailing a considerable number of experiments made with the "electric furnace." The general ideas and essentials of this apparatus have been previously described in this journal (*Pharm. Jour.*, [3], xii., p. 1030). In the present experiments a very powerful current, produced by five dynamo machines, driven by an engine of 12-horse power, was employed. The current in ampères varied from 250 to 300. The intensity of the heat was such that the most refractory clay crucibles supplied by the Patent Plumbago Crucible Company were invariably cut through in a few minutes, and except for experiments of short duration were useless. Plumbago crucibles stood extremely well. Obviously, however, they could not be employed for all purposes owing to their tendency to cause carbonization of the metal experimented with. In some experiments the fusion of the metal was effected in a bed of lime, sand or electric light carbon dust. The latter is a very bad conductor, and as in the case of lime and sand allows the arc when once formed to maintain a passage through it to the metal beneath. Experiments were made with wrought iron, steel, white iron, cast iron, spiegeleisen, silicious pig iron, nickel, copper, platinum and tungsten. Six pounds of wrought iron was fused in twenty minutes; on pouring into a mould the metal was found to be crystalline, and could not be forged. White iron fused in a clay crucible for thirty minutes when fractured did not appear to have undergone any change. As much as twenty pounds of steel files was melted in one hour; the metal was, however, invariably full of blowholes when working with such large quantities as this. Cast iron fused and kept under the action of the arc forty-five minutes in carbon dust was not materially changed as to greyness, and the general character of the metal as to the way in which it worked under the tool was not materially altered. The object of the experiment was to ascertain the maximum amount of carbon iron is capable of taking up under circumstances presumably the most favourable. The result is hardly that which would have been anticipated. When spiegeleisen was fused in a plumbago or a clay crucible graphite separated as the metal cooled. Silicious pig iron, containing about 10 per cent. of silicon, was fused by itself; it showed but little change, except that some graphite had separated. One pound of grain nickel was fused and poured in eight minutes. The fused metal had a brilliant granular fracture; it could not be cut properly in the shaping machine, shearing off under the tool. One pound of grain nickel fused in carbon dust for twenty-five minutes, yielded a dark grey carburized metal, which worked well under the tool. Three-quarters of a pound of copper was fused for about half an hour in carbon dust. On examining the result it was found that *all but three-quarters of an ounce had been vaporized.* Those who were present during the experiments suffered no ill effects from the atmosphere charged with copper, which they must have breathed. As much as eight pounds of platinum was rendered perfectly liquid in a quarter of an hour. The greatest difficulty was experienced in satisfactorily fusing tungsten; it was, however, accomplished for the first time on record, being previously known only as a grey powder. Tungsten when fused in the electric furnace is, when untarnished, pure white and brittle, the grain being very close. It was found to have its fusing point lowered by addition of carbon. The conclusion is drawn that the amount of any given metal which can be successfully fused in the electric furnace is dependent on (*a*) the relation between the volatilizing point and the fusing point, *i.e.*, the extent to which the volatilizing point is higher than the fusing point; (*b*) the conductivity of the metal for heat. It thus happens that platinum can be more readily melted than steel and in greater quantity for a given expenditure of energy.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A MEETING of the above Association will be held at 32A, George Street, Hanover Square, on Wednesday evening next, October 25, at 9 p.m. precisely, when a paper, "A Summary on Cinchona Barks of Commerce," will be read by Mr. WILLIAM ELBORNE.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, the 4th inst., at the College of Physicians, Kildare Street, at three o'clock.

The President, Dr. Charles Tichborne, in the chair.

The other members present were:—Messrs. Allen, Bennett, Brunker, Doran, Grindley, Hayes, Hodgson, McIlwaine, Dr. Montgomery, Dr. Collins, Messrs. Payne, Pring, Simpson and Wells.

Mr. Hugh Fennell, the Registrar, read the minutes of the last meeting, which were confirmed.

A letter was read from Dr. Creed Meredith and Dr. Dunne, Secretaries of the Royal University, stating that certificates for practical pharmacy given by a pharmaceutical chemist were accepted by that University, the words of their regulation on the subject being "under an apothecary or a pharmaceutical chemist." If this did not meet the views of the Council the letter requested them to communicate.

The President: A paragraph on the subject should be inserted in the Calendar.

Mr. Fennell: The word "Irish" is not used.

Dr. Montgomery: They do not intend that there should be any objection to an English pharmaceutical chemist.

Mr. Hodgson: Would one of our pharmaceutical chemists be granted the same privilege in England?

The President: You cannot dictate to the Royal University what privileges they will give to anyone.

Mr. Hayes: It does not concern us whether they will admit Englishmen to the privilege in question or not. They say they will admit our pharmaceutical chemists, and that is all that we have to do with.

Mr. Brunker: The Royal University is an Irish body, and only contemplates the granting of degrees in this country.

Mr. Payne: The English Pharmaceutical Society would not recognize our certificates.

It was ordered that the Registrar should acknowledge the letter of the Secretaries of the Royal University, and state that the information conveyed therein was satisfactory.

A letter was received from Mr. David Baxter, M.P.S.I., asking for a duplicate of his licence, which, his letter stated, had been torn in transmission.

After some discussion,

On the motion of Dr. Montgomery, seconded by Mr. Hayes, it was ordered that Mr. Baxter should be informed that the Council could not grant him a fresh diploma, but would give him a certificate stating that he had passed the examination, on his paying a fee of 10*s.* 6*d.*

A report of the Law Committee was read stating that a case having been submitted to Mr. Purcell, Q.C., as to the legality of pharmaceutical establishments conducted by the representatives of deceased apothecaries who had not been registered as pharmaceutical chemists, Mr. Purcell had given the following opinion:—"I am clearly of opinion that neither of the cases comes within the provisions of the 32nd Section of the Pharmacy Act, Ireland, which applies only to the representative of a pharmaceutical chemist or druggist who was registered as such during his lifetime: and, therefore, that the parties are not entitled to carry on the business of a pharmaceutical chemist or druggist under that Act. Nor are they so entitled as representatives of a licentiate apothecary, as the Apothecaries Act contains no provision enabling them to do so. By doing so, therefore, they incur, in my opinion, the penalty imposed on them by Section 30 of the Pharmacy Act."

It was pointed out that apothecaries had the privilege of registering as pharmaceutical chemists and thus obtaining the privileges given under the Pharmacy Act, by the payment of a fee of three guineas.

On the motion of Mr. Hodgson, seconded by Mr. Grindley, the report of the Law Committee was adopted.

A report of the Certificate Committee dealt with the case of Mr. Walter Boyd, who sought to be admitted to the examination. He had made a declaration stating that he had been engaged for upwards of two years in the compounding of prescriptions and in practical pharmacy under the superintendence of the late Mr. John Goodwin, at No. 6, Merrion Row, but that the sudden and unexpected death of that gentleman prevented him from obtaining a certificate from him.

The Registrar, by direction of the Committee, wrote to Mr. Boyd asking if, during the time named in his declaration, he had been engaged in the *bonâ fide* practice of pharmacy at 6, Merrion Row, and not elsewhere; and he now replied, stating that he had been exclusively so engaged at that place during the time mentioned in his declaration.

After some discussion,

On the motion of Mr. Brunker, seconded by Mr. Hayes, it was resolved:—

"That Mr. Boyd's declaration be accepted in lieu of a certificate."

The Council then proceeded to consider the recommendations of the Pharmacy Act Amendment Committee. The first was:—

"That no pharmaceutical chemist or apothecary shall legally hold a branch establishment for the retail of poisons or compounding of prescriptions except under the responsible management of a duly qualified pharmacist."

Mr. Wells thought that the word "apothecary" ought to be inserted after the words "duly qualified pharmacist."

Mr. Hodgson: We have no power to deal with apothecaries.

Dr. Montgomery was of opinion that it would be best to legislate for themselves, and to leave the apothecaries out. Let the Apothecaries' Hall deal with them. It would lead to ill-feeling between the two bodies if they used the word "apothecary."

Mr. Hayes: Send a letter to them and ask them would they approve of the insertion of the word "apothecary." The object is that an apothecary shall not open half-a-dozen shops without having a qualified assistant in each.

Mr. Wells: I do not think they can do that now.

Dr. Montgomery: An apothecary may have either an apprentice, or an assistant who must be qualified under the Apothecaries' Act, under a penalty of £20.

Mr. Allen: A pharmaceutical chemist should be enabled to employ an apothecary if he chooses. If you don't add the word "apothecary," he must have a pharmacist.

Mr. Brunker expressed a similar opinion.

The President: My view is that we should assist the apothecaries in this matter. We asked the assistance of the Apothecaries' Hall in these amendments, and they said they were quite willing to act with us and to give us every assistance. Let us submit to them for their opinion a copy of the resolution with the word "apothecary" inserted. We may be doing them an injury by not inserting the word. It is used all through the Pharmacy Act.

Mr. Pring: An apothecary can register as a pharmaceutical chemist by paying three guineas. That gets over the difficulty at once.

The President said he thought that would meet the case.

The recommendation was unanimously adopted originally stood, but leaving out the word "apothecary.'

The next amendment proposed by the Committee was:—

"That all assistants engaged in dispensing must give sufficient proof of their competence by examination, or by having passed a sufficient time as apprentices."

Mr. Wells: Three years ago a resolution was passed that there should be an examination for assistants.

Mr. Pring said that it was very difficult to get assistants, and if an examination were made indispensable it would be a great deal more difficult. He believed that every man in his establishment was a qualified man, but they had not passed examinations for their places, although they might have passed them in England or elsewhere.

Mr. Brunker: The feeling of the Society is that there shall be an examination for the assistants.

Mr. Wells: But not a compulsory one.

The President: If you do not make it compulsory you need not have it at all.

Mr. Payne said he did not agree with the second recommendation. If adopted it would put a difficulty in the way of getting good assistants. They were hard enough to get at present. At present they got a very good class of assistants from Scotland and England, who possessed a great deal of practical knowledge because they had served apprenticeships.

Mr. Hayes: We shall not be prevented from having Englishman or Scotchmen if we wish it, but the adoption of this recommendation would prevent it.

Mr. Simpson considered that the recommendation, if passed, would interfere immensely with business.

Mr. Hodgson: What will you gain by passing this recommendation? Every respectable compounder feels that his position and his means depend upon the duties which he has undertaken being critically and properly performed, and, therefore, for his own safety he will be careful as to whom he engages as an assistant. It almost amounts to telling gentlemen that they require to be taught how to engage assistants.

Dr. Montgomery was in favour of having an examination for assistants. They had to look not to gentlemen occupying such positions as Mr. Pring or Mr. Payne; they had to take care of the interests of minor men.

Mr. Payne moved that the recommendation be rejected.

Mr. Wells seconded the motion, which was carried, Dr. Montgomery alone dissenting.

The third and last recommendation was as follows:—

"That all candidates for the licence shall be required to produce evidence of having passed three years in a *bonâ fide* apprenticeship to an apothecary or pharmaceutical chemist keeping open shop."

Mr. Hayes moved that the term be a minimum of five years.

Mr. Pring seconded the motion.

The President begged of the Council carefully to consider this proposal. It involved two points. First, were they likely to get Parliament to approve of such a clause. He was quite sure they would not as compulsory for a licence. Next, was the proposal a fair one. No doubt it would be the best thing that could happen to any youth to be in such an establishment as that of Mr. Pring for five years; but there was no earthly object in insisting upon an apprenticeship. That Council had nothing to do with the exigencies of trade. They were custodians of an Act of Parliament. The preamble of it declared that there was a scarcity of compounders in Ireland, and that it was desirable to create pharmaceutical chemists. The pharmaceutical chemist in that country owed his existence to the fact that there were not enough of men in country places to compound prescriptions. Therefore the Council should put aside every personal consideration in this matter and only have regard to whether or not they were properly carrying out the requirements of the Act of Parliament. That there were not enough of pharmacists in the country was plain from the fact that the Registrar of the Apothecaries' Hall had received five applications within the last six months, and two within the last week, for qualified men, either pharmaceutical chemists, or apothecaries, to take charge of establishments in the country, and he had been unable to get the men. Therefore would the Council be justified in putting restrictions upon candidates coming forward for the licence? If they thought three years a desirable minimum to teach a man his business, let them make that the term: it would not preclude the party from spending five years, or the principal from getting him as an apprentice for six; but that was a personal arrangement. There was no doubt that apprenticeships, particularly in country places, had been abused; and also that the system of apprenticeship was to a great extent exploded and gone out amongst medical licensing bodies. In a first-rate establishment the apprentice was in his right place, but he knew two or three very large establishments, in which six or seven men were employed at compounding, and in those establishments, nevertheless, they would not take apprentices. Had they any right to say to those assistants, that although they might have obtained the greatest skill and experience they should not come forward for the licence, simply because they had not submitted to a kind of black mail which was only imposed for the benefit of the employer? (No, no!) Well, that was his (the President's) opinion with respect to the apprenticeships. He also strongly objected to so long a period as five years being a minimum at present. On the other hand if they made it three years now they could, if necessary, lengthen the period by degrees afterwards. Besides there were other important educational branches as well as compounding. In England they were going to make theoretical and practical chemistry, botany and materia medica compulsory. His experience was that it was in these subjects that the dispenser failed. He therefore urged that the clause should provide that the person had passed three years as a *bonâ fide* "apprentice" or "assistant" to an apothecary or pharmaceutical chemist keeping open shop.

Mr. Wells: Have they it in England?

The President: They require a three years' apprenticeship, but I believe it is not strictly carried out. The want of it is winked at.

Mr. Brunker said he was not for adhering to the word "apprentice" in the clause, the words "or assistant" would answer the purpose. The President had spoken of large establishments that did not take apprentices, but if they went through those establishments they would find that every one of those assistants had served an apprenticeship elsewhere. He (Mr. Brunker) did not take apprentices, and yet every assistant in his establishment had served an apprenticeship elsewhere.

The President: I do not think that is always the case.

Mr. Brunker said it would be found that there were very few assistants that any of them would care to engage as compounders, who had not served an apprenticeship somewhere. Apprenticeship was not so inconsistent with the spirit of the times as the President appeared to suppose. It was very general in the business; and it was very important in the interests of pharmacy that some such regulation as that which was proposed should be laid down in a hard and fast way. They had seen how much difficulty arose from having matters left open. They had been fighting for month after month over the certificates of certain candidates for the licence, simply because the law was not laid down clearly as to what were the requirements in practical pharmacy from those candidates. Therefore, whether they made the term three or five years, let it be a hard and fast rule about which there could be no dispute. He believed himself that three years should be the minimum term for both apprentices and assistants, and he would not object to five years.

Mr. Wells was not sure that there was such a want of assistants. There were vacancies in one of the poor-law unions for which there were nearly twenty applicants. He knew of other situations for which first-class men were wanted, but only small salaries were offered.

Mr. Hodgson said they were now dealing with candidates for the licence and not assistants. He was com-

pletely opposed to the principle of apprenticeship. He considered that the adoption of it would be a move backward. Apprenticeship was completely ignored in the Pharmacy Act, and very properly. The principal was paid for the apprentice, who no doubt learned the general details of the business; but his relation of apprentice did not at all imply that he would be occupied in compounding during his term. The Pharmacy Act did not contemplate apprenticeship, but contemplated that the man should be occupied in compounding and practical pharmacy. It was for the purpose of opening the door to the Major licence for carefully trained compounders of medicine that apprenticeship was ignored in the English Pharmacy Act, and he now objected to any attempt to set up apprenticeship by a side wind.

The President: It is contrary to the spirit of the country.

Mr. Hodgson: It is contrary to the spirit of the Act of Parliament and I do not think it would work well. By adopting what is proposed you would shut out a great many competent and thoroughly qualified compounders.

Dr. Montgomery moved that the further discussion of the recommendation be adjourned to the next meeting. It was getting late and members of the Council were leaving.

Mr. Hayes seconded the motion.

The President: It should be understood that the first two recommendations have been disposed of.

Mr. Payne asked if a resolution were sent to the Privy Council and sanctioned by them, would it not have the same force as an Act of Parliament.

The President: Not if it were contrary to the Pharmacy Act.

Mr. Brunker gave notice that when the discussion of the question should be resumed he would move that all candidates for the licence should be required to produce evidence of having passed three years *bonâ fide* in the exclusive employment of an apothecary or pharmaceutical chemist keeping open shop.

The motion of Dr. Montgomery was then put and agreed to.

Mr. James Gray Fyvie, of Coleraine, was elected a member of the Society.

Some financial business having been disposed of, the Council adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the session was held on the evening of Wednesday, October 11, in the rooms of the North British Branch. Mr. Peter Boa, President, in the chair.

The minutes of the last meeting having been read and adopted—

Mr. Boa first made a few introductory remarks in which he pointed out the great value of such an Association, and the eminent desirability of every assistant and apprentice availing himself of its advantages. He also referred to the honour which had been conferred upon him by being elected their President, a position carrying with it a responsibility, which no feeling of inability on his part would prevent him from endeavouring to fulfil to the best of his power. Having urged the members to be regular in their attendance, so that the splendid audience which he was so gratified to see on the opening night might be continued during the session, he proceeded to deliver the inaugural address.

Mr. Boa said that the business of a chemist and druggist, as it is now conducted in these realms, was a very unsatisfactory one. Part of the work was worthy of being called professional, but another portion of the work could not by the greatest stretch of imagination be so denominated. It was this mixture of the professional and commercial types, which was the cause of all the ills to which the pharmaceutical body is heir, because the two were not compatible. Between the man of business and the professional man there was a well marked difference and it was useless to expect to have in one man, or business, a satisfactory combination of the two, unless on rare occasions. Until a condition was attained in which the two should be kept apart, pharmacy would not have attained its true position. The practice of pharmacy should be removed from the conditions and influences which make it necessary for its members to discuss the propriety of competing with co-operative stores, grocers, drapers, and such like, in the prices of patents and other commodities of a similar character. In dealing with stores the members of the public were not surprised if they found themselves occasionally "done," but they did not hesitate to run this risk for the sake of the average saving. With a pharmacist it was entirely different; to hm no suspicion of even a possibility of his supplying drugs of inferior quality should attach. To supply drugs of genuine quality and compound prescriptions in the most approved style was the proper province of the pharmacist, and in this he need never fear competition from stores. If he made himself a specialist in those things he need not fear any encroachment on his territories by unqualified persons. Specialists were the order of the times. The public demand them in every department of commercial or professional life. "Cutting" grocers and co-operative stores were specialists. In the departments in which they generally compete against pharmacists the latter are not specialists, hence the reason they found themselves defeated. In the case of drugs pharmacists argued that they were entitled to an extra profit on account of the guarantee of quality which the purchaser had in buying them from men who are specially trained to the recognition and testing of genuine specimens. The public was willing to admit this, but scarcely recognized the same argument in the case of retailing a tin of Swiss milk. When a man, through force of circumstances, engaged in work not in keeping with the business to which he had been specially trained, he did that work in an unsatisfactory manner. For instance, medical men who dispensed their own medicines invariably executed their compounding in as lovenly fashion, doing it under a state of chronic protest. So, in like manner, chemists, having to trade in articles belonging to the category of grocers or perfumery, conducted this portion of their business in a way which did not always give satisfaction to their patrons. There were at present few chemists' businesses that were not "mixed," the difference being only one of degree; but until this class of business disappeared there would always be anomalies which would prevent the public from according to the calling the respect and standing to which it was entitled on account of the knowledge and attainments of many of its members. This, however, would require many years for its attainment, but he did not despair of its being by-and-by brought about. There was great reason to be encouraged by the improvement in the status of pharmacists in recent years. It was only fourteen years since the compulsory examinations were established. Complaints were made that unqualified persons still conduct businesses and yet escape punishment. To the speaker fourteen years did not seem a very long time in which to effect a complete reorganization of a whole trade or profession throughout a country, and he was disposed to wonder rather that there were not more unqualified persons in practice than that there were any. The compulsory curriculum which it was proposed to establish for chemists and druggists was a subject now occupying some attention. At present there was an indefiniteness in the training of pharmacists which was highly to be deprecated in the case of a profession, the members of which were entrusted with such grave responsibilites, not only because it failed to satisfy

the ideas of those who had to trust them, but on account of its leaving it possible for a chemist to go into business with an imperfect acquaintance with some parts of his duties which he might ever afterwards regret. In justice to himself and those who trusted him to compound their medicines, a definite course of scientific study ought to be established for a pharmacist. It would be the first step in establishing a status for him, which might have a reasonable claim to be designated professional. To make a student take certain classes at a university before he presented himself for examination would give some guarantee that he had been educated for the responsibilities he would be legally entitled to undertake should he satisfy the examiners. True he might pass the examination well without this course of training, but the mere fact of his doing so would never give him the standing that both taken together would confer. The percentage of failures in the examinations of the Pharmaceutical Society was larger than in those of any other examining body in the kingdom. He had not heard anyone say that the mental calibre of the men who became pharmacists was inferior to that of those who enter any other business or profession in which examinations are required. He might say that he was surprised rather that the percentage of passes was so high, and he considered it much to the credit of the candidates that they go up so well prepared as they do, when only a very small percentage of them had the advantage of a systematic preparation. If there were any means of obtaining a return of the failures of those who present themselves for examination after a course of training, say at Bloomsbury Square, he was confident that the percentage would be found very small indeed. This went to show that it was not the capacity of the candidates that was at fault, but rather the means at their command for acquiring the information required of them. In the event, too, of pharmaceutical students having to attend several of the classes at the Universities, they would have the opportunity of associating with the medical students who are to form their contemporary generation of physicians and surgeons, and in this way many friendships would be formed, and much done to promote reciprocity of confidence and respect. Another matter in which some changes on the present custom would have to be made, was the training of apprentices. At present the apprenticeship of a chemist and druggist was not an attractive period of his experience. In view of a compulsory curriculum and a professional status there must needs be some modifications of the present means of introducing him to his professional work. At present the initiatory stages of his career were largely taken up with dusting bottles, polishing drawer fronts, and, in some cases, washing measures and mortars—work which more appropriately belonged to some one whose educational advantages did not warrant his undertaking more responsible employment. The supporters of the present system said that at the outset the apprentice must learn habits of neatness, arrangement, etc., and that his period of bottle dusting was eminently calculated to enable him to acquire these; that by washing and drying the measures and mortars he acquired a familiarity with their handling, which world give him confidence in using them. The truth of these arguments he did not question, but those who advanced them seem to forget, however, that a lad who had been well brought up might have acquired neat and methodical habits before the time when he began his business career; and as for the confidence in the use of measures acquired by washing them it might as well be said that it is necessary for a man to go through a course of cleaning guns before he learns to shoot. Whilst, however, the present system of conducting the business continued it might be expected that more or less of the work now falling to the lot of the apprentice would still devolve upon him. The many and various ornamental accessories of the shop must be kept bright. Carboys, specie jars, show cases, fancy drawer fronts, elaborately labelled bottles, all these required constant attention to maintain the brilliant appearance which they were intended to give to the establishment. But good reason for maintainimg so scrupulously the present style of conducting business he failed to apprehend. The carboys of coloured water and specie jars with elaborately painted devices were relics of ancient times when the art of an apothecary was considered to be associated with the supernatural. The presence of these things did not lend any additional effect to the medicines. Their presence would not tempt people to buy more physic than they would do were they absent. The cost of their original purchase and of maintaining them was considerable, and the consequence was that the chemist had to resort to a trade in sundry commodities extraneous to his legitimate business in order to gain a living. For the purposes of a compounder of medicines all that the pharmacist required was a room or rooms, fitted with shelves, drawers, bottles, etc., for the storage of the drugs. His name and occupation could be advertised by a brass plate affixed to his door. It would be an advantage to the chemist not to have his laboratory open to the interruptions caused by any small boys who may find it convenient to run in for "coppers for a sixpence,"—as not unfrequently happened under the present arrangements. It was now considered unnecessary and in fact undignified to expose stock in the windows of a chemist's shop, and he hoped in a few years it would be unnecessary for a chemist to incur the expense of a shop at all.

Mr. C. F. Henry, in proposing a vote of thanks to Mr. Boa, said there could only be one opinion as to the instructive, and useful, and philosophical address to which they had all listened, he felt sure, with pleasure. He had come there expecting a good deal, but the result had exceeded even his highest anticipations. The address contained many very original ideas, some of which might prove matter for discussion during the present session. He did not think druggists ought to be frightened by the competition of stores, grocers, etc. It was well known that the drugs retailed in such places were, as a rule, of an inferior quality, and sooner or later the public would find out that if they wished to purchase drugs of reliable quality, they must do so from those who, from their special knowledge and training were competent to guarantee the purity of their wares. He had no doubt that the members of the Association would feel that they had been highly honoured by the attendance at their opening meeting of the President and other eminent members of Council of the North British Branch, and he had very great pleasure in inviting those gentlemen to address to them a few words of encouragement and advice.

Mr. J. R. Young said that he had great pleasure in seconding the vote of thanks to Mr. Boa. It was the first time he had been present at a meeting of this Association, and he was much gratified to see such a meeting. The address contained some very novel ideas, and some which had evidently been well weighed, and which had an important bearing upon the business of a chemist and druggist. He agreed with very much that had been said as to the training of apprentices, but believed that the introduction of the proposed compulsory curriculum would remove many objectionable features in the present state of things. An apprentice who had passed the Preliminary examination before entering the trade could hardly be expected to spend two or three years washing measures, dusting bottles, running messages, etc., and yet it was essential that he should have some training in the practical details of his calling. He thought they were still very far from the time when the chemist's shop would give place to a room in his private house, and the signboard to a brass plate on the door. On the Continent pharmacists were generally considered to be much in advance of them in professional status, and yet they still had shops, and he thought that no such

serious change was likely to come about for many a long year to come. The cause of pharmacy had been greatly benefited by the efforts of the fourteen years which had elapsed since the institution of compulsory examinations. Looking back about twenty years he remembered that the assistants of that period had some meetings to get the hours of business shortened or something of that kind, but a meeting such as this and an opening address such as he had just listened to could not have been had at that time. He concluded by referring to the many advantages to be derived from such an Association, and expressed his earnest wish for its continued prosperity.

Mr. Alexander Napier, President of the North British Branch, had much pleasure in supporting the vote of thanks which had been proposed. By coming there that night his thoughts were thrown back to a time when an Association of a similar kind, though with comparatively very small numbers, existed in that city. They used to meet in a room in Princes Street, about the year 1862 or 1863, and he remembered that they had many enjoyable gatherings and many interesting papers. Some of those who were connected with that Association had now removed to other countries, but they still showed their appreciation of old acquaintances by occasional contributions to the North British Branch of the Pharmaceutical Society. He earnestly desired to see the Association prospering because he believed it to be a nucleus of very important and valuable influence.

Mr. J. B. Stephenson said he was very glad to be present that night, because he had known that for several years this Association had been doing good work. He had no intention to criticize the address, although it contained a good deal of explosive matter, especially toward the close. He would heartily congratulate Mr. Boa on his excellent address which contained many views which he had himself given expression to, on more than one occasion, from that chair. There was just one bit of advice which he would like to impress upon the members of this Association, and that was, that success did not depend upon numbers but upon individual effort. No matter how large the membership of such an Association as that might be, unless they had individual effort they could not succeed, and that was a principle which he would strongly advise every member to bear in mind and act upon. He had already congratulated Mr. Boa, and he would conclude by congratulating the Association on the truly academic address to which they had listened.

Mr. William Gilmour said he had been asked to say a single word, but he did not think it was necessary to add to what had already been said as to the excellent address to which they had listened. He believed that this Association was a great educational institution and that it gave a good tone to the whole profession. The department of their work to which he would more particularly refer was the prize competition for apprentices which they had just instituted. He would strongly advise all apprentices to avail themselves of that opportunity. Not that every one would get a prize, because that could only be the fortune of two; but, even if they should not be successful in gaining a prize, the experience of going in for the examination would help to give them confidence in the future. He observed that this confidence in going in for an examination had been emphasized by Mr. Ince, the other day, in his inaugural address to the students at Bloomsbury Square, and he believed it was of very great importance and that they were, as a rule, far too frightened for examinations. He thought there were many points in Mr. Boa's address which were worthy of the highest commendation and that it struck a keynote which he hoped would be maintained throughout the whole session.

The discussion was continued by Messrs. Crowden, Hill, Low, and McEwan, and the vote of thanks was briefly acknowledged by the President.

The Secretary then made a statement as to the apprentices' prize competition, and the President having intimated that the next meeting would be an open one, and would be held on Wednesday, November 1, the meeting was closed.

Proceedings of Scientific Societies.

AMERICAN PHARMACEUTICAL ASSOCIATION.

This Association commenced its Thirtieth Annual Meeting, on Tuesday, September 12, at Niagara Falls, N.Y. A lengthy and interesting address was delivered by the President, Professor P. W. Bedford, from which the following passages are taken:—

In many of the States where Pharmaceutical Associations have been formed there now exist Boards of Pharmacy, organized under State laws, which have been aided by the action of the State Association. Unfortunately, in a number of States the Associations have failed to secure the passage of pharmacy laws.

During the present and preceding years such failures have occurred in Massachusetts, New York, Pennsylvania, Louisiana, Virginia, and possibly other States. So far as I have been able to procure statistics, pharmacy laws exist in the following States:—Maine, New Hampshire, Connecticut, Rhode Island, New Jersey, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Iowa, Illinois, Wisconsin, Missouri, and Kentucky; and in the cities of New York, Brooklyn, Philadelphia, Baltimore, Washington, Cincinnati, and San Francisco.

Pharmacy laws in the United States never can be made uniform. The feasibility of obtaining the favourable consideration of legislators to a fair, uniform pharmacy law is one of the possibilities of a later if not a "latter" day; but at present the literature of pharmacy laws is an entanglement of the mind in the mazes of legal enactments.

It seems that in the most of the Boards of Pharmacy there is a fair yet just and conservative rendering of the laws applicable to the subject.

From a correspondence with all the Boards of Pharmacy mentioned, I am led to believe that each board tries to faithfully execute the laws under which they are appointed. These laws vary, however, widely; in some cases permitting all in business to become registered, in others requiring an examination of all persons who have not been in business on their own account for a term of years.

Candidates are required to undergo an examination, usually before each member of the board to which he applies; and, on a comparison of replies to my inquiries I find that the lowest percentage at which any candidate can be passed successfully was 60 per cent., while in one or more boards they decline to pass any who fall below 80 per cent.

From the replies received by me from the Boards of Pharmacy, it would appear that on the first examination about 60 per cent. of the candidates are successful, the remaining coming up one or more times until successful or refused further examinations.

In some instances copies of questions used by the Boards of Pharmacy have been submitted to me for my own information on the subject, and it is fair to state that in every such case I have found them commonsense, practical questions, calculated to bring out knowledge rather than to surmise what the answer should be.

Under this incongruity of pharmaceutical legislation it seems almost impossible for Boards of Pharmacy to take any concerted action, save an agreement to increase the care exercised in questioning and valuing the replies of applicants examined.

To make the certificates of proficiency exchangeable in the several parts of the Union to which their possessors

might direct their footsteps would seem to be not only impossible, but in some cases a positive error.

There should be a difference between the standing of one who has passed under a lax law and one who has been subjected to a critical examination, and both these should be of less value than the college diploma, which is a guarantee that its possessor has given the time to carefully pursue a pharmaceutical course of study and has gained his honour after an examination that is usually a very thorough one.

The college graduate necessarily has the advantage in education and thoroughness. I would not be considered as discouraging Boards of Pharmacy or unduly extolling the College of Pharmacy, but it seems a self-evident fact that the practical student with a college training is the man that will make the better mark in his life-work.

To-day I plead the cause of pharmaceutical education. I would call your attention to what the founders of this Association recorded at their meeting thirty years ago on this very subject:—

"The subject of pharmaceutical education being considered of paramount importance by this Convention, and having been deliberated upon by its committee, the following resolutions have been adopted expressive of the sense of the Convention in reference to this important subject: It is resolved—

"'1st. That this Convention earnestly recommends to the practising apothecaries in all sections of the United States, in places where they are sufficiently numerous, that they should organize themselves into societies for mutual improvement as pharmaceutists, for the encouragement of pharmaceutical literature by the formation of libraries, and for the adoption of rules of conduct calculated to elevate the character of the profession among them.

"'2nd. That as schools of pharmacy are the most effectual aids to the student, this Convention respectfully recommends to pharmaceutists in all cities where they are numerous, to take measures for the establishment of such institutions as powerful means of improving the education of their assistants and apprentices, and thus benefiting themselves and the public.

"'3rd. That this Convention also recommends that more attention should be given by proprietors to the claims of apprentices or assistants, who are in course of study, as regards the facilities for learning, and the tuition which of right should proceed from them (the proprietors) in the absence of schools of pharmacy, especially in the provision of the best books of reference on the several subjects that claim the attention of students of pharmacy.

"'4th. That in the opinion of this Convention it is desirable that apothecaries should be more generally careful, in taking pupils or apprentices, in reference to their fitness as regards natural endowments and preliminary education, believing that many persons who are now engaged in pharmacy and unfitted for its duties might thus have been prevented from misapplying their time and abilities in a profession for which they are not calculated.'"

Surely these resolutions of thirty years ago have the true spirit which should animate not only this Association collectively, but each member individually.

Boards of Pharmacy are, or should be, only a means to an end. They are intended as a safeguard for the present time, a method only to weed out the utterly incompetent, but they are not now, nor were they ever intended to be, educational.

The pharmacy law of England enforces an examination much more rigid than is carried out here, but it would seem that even there, to a large extent, the education given in most all the institutions have solely for their object the success of the candidate before the Board of Examiners, rather than a solid education.

Contrasting the educational establishment of the Pharmaceutical Society of Great Britain with the Colleges of Pharmacy of Philadelphia or New York, we would call the English organization a financial failure. Its students are comparatively few as contrasted with the two colleges named, certainly not more than one-fourth in number, yet there can be no doubt that its course of instruction is thoroughly practical and sound.

Throughout Great Britain there have been established rival schools, to "coach" or "cram" the applicants preparatory to the examinations.

Punch has aptly compared such teaching to the process by which water is charged with carbonic acid, and the examination to the removal of the cork which lets out all the knowledge attained, and they are never able afterward to come up for an examination without being crammed all over again.

There are some who are born pessimists, who see no bright future in pharmacy; who are for ever lamenting the days of the past, when the public were not so enlightened on facts relative to our business; when competition was not so sharp; when education and knowledge were not so necessary as now; who fear that business laws are tying them down as slaves to certain modes or business regulations, and they wish for the days of the past to be revived. No such lamentations are available. The present and the future have demands that must be met and conquered. The "sign of the times" is a sound and thorough education—one that will fully fit the young pharmacist to cope with the scientific problems of our business as well as the simple knowledge of cost and gain on his merchandize.

Those who have no soul above the merchandize side of our calling will ere long be left behind in the race, and it will be truly the "survival of the fittest."

Regarding the examinations of pharmaceutical students a few words may be added.

The records of the examinations in London show that fully one-half of the applicants fail on their first effort.

Doubtless the examinations are rigid, but from a careful examination of the papers with which I have been favoured in the past I should say that they were none too much so under the circumstances.

Of the large number of applicants but a small proportion fit themselves properly by education, but, seeking a shorter road, attend the establishments where they are forced into a superficial knowledge, and when the days of examination come, they risk their success, usually as risky as successful.

The colleges of pharmacy in our land are acknowledged to be excellent in their methods of teaching. Those who attend their instructions may be classed as the more intelligent and promising of those who are growing up in the ranks of pharmacy. Yet even with the large numbers of those availing themselves of such education, not one-tenth of the young men are attending our colleges of pharmacy. What is being done for the other nine-tenths? It is not my observation that employers, as a class, give themselves much trouble to advance the technical knowledge of their *employés*, being as a rule more anxious to have them know the money value than the properties of the commodities they handle.

The founders of this organization gave their views when they said:

"The subject of pharmaceutical education is considered of paramount importance."

The colleges of pharmacy were the originators of this Association; this in turn has been the originator of the State Associations, and we may note that some of the recently organized colleges of pharmacy are the outgrowth of the State Associations. There are none too many colleges; there is room for more; if they are only good ones and willing to maintain their standards of education and examination to equal in value those now adopted by the older colleges of pharmacy. If, however, such institutions are to be perverted to facilitate improper

modes of procuring the insignia of competency without the substance, it should be our bounden duty to expose such schemes, and take active measures to prevent their practices.

Our colleges should be sustained and encouraged by the active co-operation of every pharmaceutist who has that respect for his business that leads him to see in it something more than mere merchandize. Our colleges are the educators, our pharmaceutical associations the promoters of pharmacy, yet not only the fifteen hundred members of this Association but the five thousand members of our State Associations should see to it that their valuable aid shall be given in the cause of pharmaceutical education; that they take active steps to send their young men to colleges of pharmacy that they may receive the solid foundation of a thorough education in their chosen profession.

Employers have also a duty to perform in another respect. It is the aid they can and should give their clerks in both theoretical and practical studies, and duty in their stores.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the sixth session of the above Association was held at 32A, George Street, Hanover Square, on Wednesday evening, October 11, when the President, Mr. W. A. Wrenn, delivered the opening address. There was a large attendance of members. Mr. Wrenn commenced by stating what a privilege he felt it, to deliver the annual address at the commencement of the session, and to follow in the steps of the many worthy men who had preceded him. He then gave a review of the progress of the Association from its foundation, now six years ago, until the present time, and expressed his belief that those who had had the difficult task of organization must view with satisfaction and pleasure the benefits which it has continued to confer upon chemists' assistants. The first meeting was held in the rooms of the Pharmaceutical Society and from that time until this the primary objects of the Association, viz., the social and scientific improvement of its members, had been continually in view. This was the commencement of a new session, and on behalf of the Council he had very great pleasure in bidding the members welcome to the varied meetings which had been arranged for the first half of the session. Having alluded to the necessity of individual exertion as necessary to continued progress, Mr. Wrenn concluded with a few well-chosen words of advice to members.

A very hearty vote of thanks was given to Mr. Wrenn for his admirable address.

Parliamentary and Law Proceedings.

The Sale of Patent Medicines containing Poisons.

Dr. Diplock held an inquest on Monday, at Notting Hill, on the body of Edward Harris, aged ten months, the illegitimate son of Jessie Harris, a widow.

It appeared from the statement of the mother that on the morning of Sunday week last she gave the deceased twelve drops of "soothing syrup" to relieve a cough from which he was then suffering. On the following day the child was taken to St. George's Nursery, Peel Street, where it was seen by the matron, who noticed its drowsy condition. On the Tuesday following it was taken to Dr. Davis, who prescribed an emetic which took off the sickness. The child, however, became worse and died on Thursday.

Dr. Davis proved having made a *post-mortem* examination, and finding traces of morphia in the stomach. He said death was due to a narcotic.

A Juror observed that the sale of such a medicine should be at once prohibited.

The Coroner explained that the medicine was sold under a stamp duty. Juries had referred to the dangerous condition of the syrup in their verdicts on several occasions. To some children, the Coroner added, the syrup was a most fatal poison, but others could take it with impunity.

Dr. Davis informed the Court that the bottle which the mother bought contained sufficient syrup to poison half-a-dozen children.

The Jury returned a verdict that death was due to a narcotic, through misadventure, to which the following rider was attached:—"That some restriction should be made on the sale of patent medicines which could be used as poisons." The Jury also expressed their unanimous opinion that no blame whatever was attached to the matron of the Nursery.

The Coroner having promised to forward a copy of the verdict to the Home Secretary, the proceedings terminated.—*Standard.*

Poisoning by Vermin Killer.

At an inquest held at Bramley to inquire into the circumstances attending the death of Angelina Abbott, it appeared from the evidence that the deceased had taken some "vermin powder" in consequence of a dispute with a man with whom she had been keeping company. A verdict of "Poisoned by a dose of vermin powder, taken while in an unsound state of mind" was returned.—*Leeds Mercury.*

Obituary.

GEORGE HENRY KENDRICK THWAITES, F.R.S.

We regret to learn that intelligence has been received from Ceylon of the death, on the 11th ult., in his seventy-second year, of the celebrated botanist, Dr. Thwaites, formerly Director of the Royal Botanic Garden, Paradenia, in that island. Dr. Thwaites was an Honorary Member of the Pharmaceutical Society of Great Britain, having been elected in the year 1856.

Notice has also been received of the death of the following:—

On the 27th of August, Mr. William Potter, Chemist and Druggist, Fleckney, near Market Harborough. Aged 79 years.

On the 2nd of September, Mr. Gaudern Wilson, Chemist and Druggist, Crowland, Lincolnshire. Aged 68 years.

On the 13th of September. Mr. Clement Taylor, Chemist and Druggist, St. John's Road, Sevenoaks. Aged 62 years.

On the 17th of September, Mr. Edgar Humphries, Chemist and Druggist, Garston, Liverpool. Aged 34 years. Mr. Humphries had been an Associate of the Pharmaceutical Society since 1875.

On the 19th of September, Mr. Thomas Teasdale, Chemist and Druggist, Goulgreave, Derbyshire. Aged 53 years.

On the 23rd of September, Mr. Thomas William Drinkwater, Chemist and Druggist, Pollard Street, Manchester. Aged 50 years.

On the 23rd of September, Mr. James Michie, Chemist and Druggist, High Street, Forres. Aged 65 years.

On the 1st of October, Mr. Edmund Crossley, Chemist and Druggist, Princes Street, Bury. Aged 54 years.

On the 4th of October, Mr. Francis Johnson, Chemist and Druggist, Kentish Town, N.W. Aged 63 years.

On the 6th of October, Mr. James Dashwood, Chemist and Druggist, Fratton Street, Portsmouth. Aged 27 years. Mr. Dashwood had been an Associate of the Pharmaceutical Society since 1873.

On the 7th of October, Mr. John Facey, Chemist and Druggist, Woodwell Crescent, Bristol. Aged 42 years.

Correspondence.

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

DR. GREENHOW'S REPORT AND THE CURRICULUM.

Sir,—I can well understand the consternation produced in the minds of Mr. Schacht, Dr. Symes, and the other supporters of the curriculum scheme, by the remarks that Dr. Greenhow thought fit to make in the concluding paragraph of his report. I can also appreciate the strong desire to explain away the obvious meaning of his words. And I would strongly recommend the advocates and opponents of the scheme to ponder them seriously.

Now Dr. Greenhow has not arrived at his conclusions hastily, but they are evidently the result of prolonged and careful observation and experience. In support of this statement I would refer your readers to his three previous reports (*vide Pharmaceutical Journal*, 1880–81, pp. 313 and 843). I will make one quotation, but I would advise all who are interested in the question to read the entire reports. In that dated March 8, 1881, writing of the Minor examination, he states:—"The propriety of compelling candidates for this examination to pass a certain time at a school of pharmacy has been a good deal discussed lately among persons who are interested in the subject of pharmaceutical education. I am, however, of opinion, that a curriculum or special course of study at a school of pharmacy is not required for persons who are preparing for the Minor qualification. The examination, when properly conducted, affords a sufficient guarantee of a candidate's fitness for registration under the Pharmacy Act."

Dr. Greenhow then proceeds to give his reasons, which I will refrain from quoting, being merely anxious to call attention to the reports themselves, and to show that the remarks in the last, viz., that under discussion at the recent Council meeting, were not made inadvertently or ignorantly.

I cannot quite understand Mr. Hampson's position in regard to the scheme, for he seems to me to halt between two opinions, and to be the connecting link between the two parties.

As chairman at the meeting of the Chemists and Druggists' Trade Association in May, he seemed disposed to throw in his lot with the advocates of the curriculum; but from the tone of his remarks in the discussion on the report on Wednesday, he seems to return to the views which first aroused my sympathy and active support. Truly the workings of Mr. Hampson's inner consciousness are mysterious. But I am not disposed to quarrel with Mr. Hampson, for, generally speaking, he evinces a highly practical turn of mind, and I suppose that sometimes what is termed the "Shadow of the Council" obscures his mental vision. Now again he and I are in complete accord. Again I ask with him, What is the prevailing state of affairs?

Are there any businesses which would utilize to the full the scientific knowledge which it is proposed to render imperative? I would not be misunderstood, it is compulsion I object to, for I would not discourage the acquisition of knowledge to any extent practicable by those who have the means and the inclination for it. But it does strike me as being not a little hard, that men should be compelled to acquire knowledge such as proposed, simply for its own sake. The compulsory examination should only require such an amount of knowledge and skill as is required for the protection of the public.

This view is neither mischievous nor misguided, but is, I contend, practical and what is more, fair. Why should men be driven out of the trade merely to satisfy the whims of those who, having by some means or other acquired a good financial position, now hanker for a professional status which they at present lack?

As to the class of men who enter the trade, the thing speaks for itself; they are for the most part suited to its requirements. For it must ever be borne in mind that our trade is of a most heterogeneous description. Why then should all be compelled to acquire such a highly trained condition? Let the Minor examination stand as it is. Institute a curriculum for the Major if you will; that is voluntary, and so no hardship would be inflicted. The two classes would be gradually differentiated and eventually perhaps, if pharmaceutical prospects improve, the Major men might bloom forth as a professional order.

But it is because the higher class fears that under the natural process it will itself disappear, or has not the patience to await its action, that it seeks to violently extinguish the lower, and having the ear of the authorities and command of the votes it may possibly achieve its purpose. Some may say that the admission contained in the latter statement cuts the ground from under my feet. I reply, Not at all, for it is, to a great extent, only the higher class that has votes. Take a plebiscite of the whole trade and then see which way the balance leans.

I, as a pharmaceutical chemist, most certainly desire to see our lot ameliorated, but not by unfair means. As soon as there is a real demand for a higher and better educated class of men, depend upon it there will be an ample supply. Openings in life are daily becoming more and more scarce for such, but they will not come forward in any numbers unless the prospect be considerably better than it is now. We cannot, under present circumstances, afford to cast aside that portion of our business which stamps us as traders, and, as Mr. Hampson says, in very many businesses pure pharmacy scarcely exists. Certainly many chemists would soon cease to exist if they relied solely upon it.

The great majority of practitioners in town and country do their own dispensing, and many of them dispense physicians' prescriptions whenever they get the chance. We, for the most part, act as jackals, picking up such scraps as may be left.

I therefore earnestly hope that whilst this state of things continues, the authorities will be cautious, and restrain somewhat their eager desire for a professional position, unless they can give us the means of supporting it.

Wantage. J. GILBERT CANDY.

Rat Poison.—A correspondent has directed our attention to an article that has recently been introduced into this country as a rat poison, which he says consists of coloured arsenic. We should think no person would undertake the sale of such an article before he has satisfied himself as to its nature.

J. Ward.—We are unable to answer your question.

A Country Pharmaceutical Chemist is recommended to call the attention of the Inspector appointed under the Sale of Food and Drugs Act to the practice.

A. B. C.—See the case reported in the Journal for January 28 last, respecting the labelling of syrup of chloral hydrate for the only decision upon the subject with which we are acquainted.

Associate.—We are unable to furnish you with any information about the oil in question.

Antiseptic.—Neither an aqueous nor an alcoholic solution can be said to "keep indefinitely," and the permanence of either would probably depend upon the condition of the salt. Other things being equal the alcoholic solution would probably remain unaltered longest.

"*Nemo.*"—Tincture of hamamelis, made according to the published formula (1 to 10 of proof spirit) is dark brown. But as there is no authoritative formula the preparation as obtained from different sources may differ in appearance.

W. I. S.—The question is one that involves medical opinion. The dose of liquor strychniæ is below the maximum of the B.P.

R. Andrews.—The preparation of the article as directed in your formula would involve considerable risk.

"*Guerra el Cuetiello.*"—(1) The extract, being an alcoholic one, should be dissolved in spirit previously to mixing it with the water. (2) Insoluble carbolate of lead being formed the lotion will be unsightly. There is no remedy for it. (3) Crumb of bread. (4) Emulsify the ol. terebinth., *sec. artem*, with half its weight of pulv. acaciæ.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bennett, Davis, Landerer, Dobson, Woodland, Brown, Morgan, Newsholme, Keyworth, Zinc, Pertinctus, Succus, Tegid, Junior, W. R. F.

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CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

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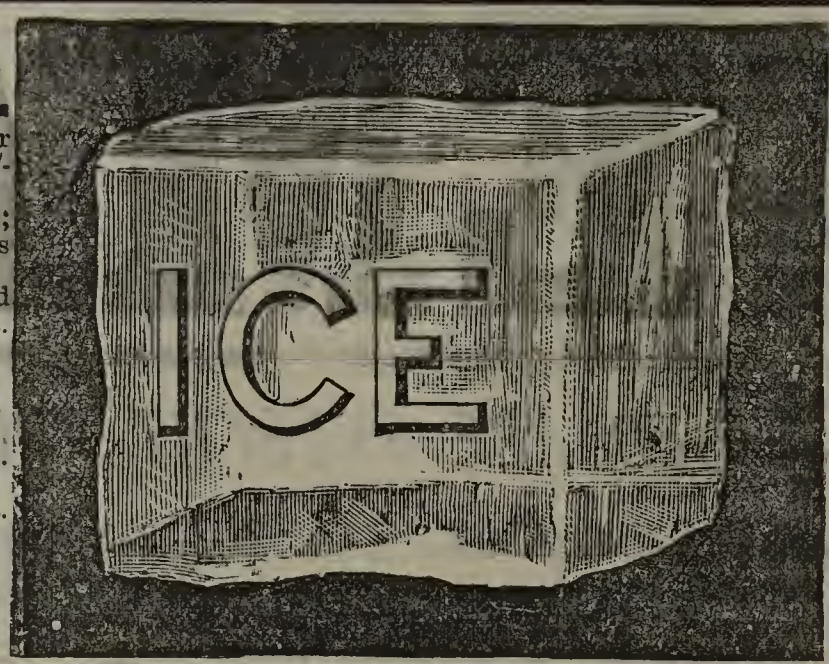

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Packing & Mats for Original Blocks free; 3d. each allowed for Mats if returned.

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ORANGE WINE, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. 6*s.* per gallon, net. cash.

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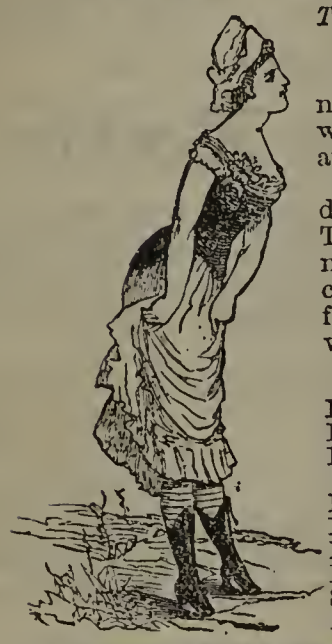

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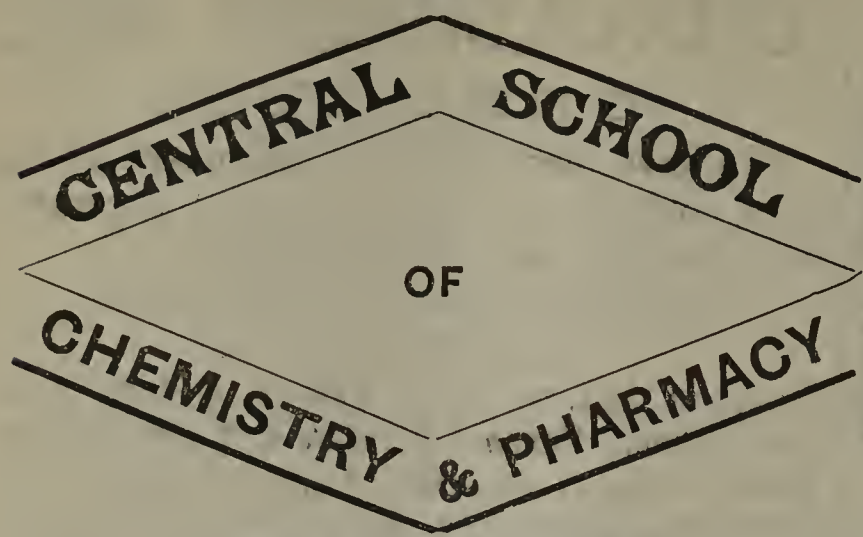

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For Syllabus, &c., apply to W. BAXTER, Secretary.

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AS Assistant in a good Dispensing business. London preferred. Good references. Age 24. Height 5ft. 9in. W., 100, Phillip St., Bedminster, Bristol.

AS Junior in a good house, London. Age 21. 4 years' experience. Good references. A. W., Mr. Smith, Pharmaceutical Chemist, Scarboro'.

AS out-door Assistant or Manager. Age 31. Single. Town and country experience. Good references. Disengaged end of month. T. P., 44, Camberwell Rd., S.E.

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AS Assistant. In London. Age 25. 4 years' town experience. A. B., 149, Marylebone Rd., N.W.

AS Junior in Dispensing business. 5 years' experience. London or suburbs preferred. Salary not so much an object as experience. Good reference. W. Paine, Dunham Pl., Ashton-under-Lyne.

AS Junior Assistant in a good Dispensing business. Age 22. Now disengaged. Reference to last employer. Total abstainer. J. G., 15, Compton St., Brunswick Sq., W.C.

ENGAGEMENTS WANTED.

AS Senior or Manager for a permanency, or would accept an engagement for the winter. Now disengaged. Age 32. With Minor qualification and considerable experience. Minor, Taylor, Chemist, Churchtown, Southport.

AS Assistant. With view to succession or partnership preferred. Age 28. Good references. Minor, 4, Victoria Ter., Gravel Hill, Ludlow.

BEGINNING of November.—South of England. Coast or watering place preferred. Age 21. Good references. Time for study. J. H. Harrison, 5, Moor Oaks Rd., Broomhill, Sheffield.

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TO Medical Men or Public Institutions.—Advertiser, 38, disengaged from 10 till 4 daily, offers his services as Dispenser. A. P. S., 820, Old Kent Rd., S.E.

IN good class trade. London or Western Counties preferred. Ætat. 23. Height 5ft. 9½in. Unexceptionable references. Minor and Hall qualifications. 7 years' experience. H. Mitchell, Blandford, Dorset.

IN London or provinces, by a fully qualified young French Assistant. Fair knowledge of English. Salary no object. Mercurius, 156, York Rd., Lambeth, London, S.E.

AS Assistant. Out-door. In London. Or as Dispenser to a Surgeon. Age 21½. Height 6ft. Passed Preliminary. 4½ years' experience. Highest references. S. R., 114, Camden St., N.W.

A CHEMIST (by exam.), with London and provincial experience, requires situation as Manager (with view to Purchase whole or part) of a genuine good Dispensing business. Or good Partnership would be entertained. Midland counties preferred. R. J., 33, Market St., Tamworth.

AS Manager, Temporary, or out-door Assistant. Major qualification. Age 38. Experience and reference good. M. P. S., 168, High St., Camden Town.

ENGAGEMENTS WANTED.

AS MANAGER of Branch or SENIOR. Qualified by examination. 20 years' London and provincial experience in first-class Dispensing businesses. A permanency desired, but would accept a temporary engagement till otherwise suited. R. C., 9, Clarendon Ter., Maida Vale, London, W.

AS out-door ASSISTANT or MANAGER. Married. Age 30. No family. Speaks French. West-end experience. K., 130, Tachbrook St., S.W.

AS JUNIOR or IMPROVER in the Retail and general Dispensing business. Age 20. 4 years' experience. G. H., Mr. W. Smith, 2, Lower Hall Lane, Walsall.

ASSISTANTS WANTED.

TO Dispensers.—For the Self-aiding Dispensary, Grantham. A qualified DISPENSER, accustomed to Hospital work. Must be a Pharmaceutical Chemist or Chemist and Druggist under the Pharmacy Act. Single. Not over 35 years. Salary £80 per annum, out of the house. Hours of business, 9 to 12 and 5 to 8; Sunday, 9 to 10 a.m. Applications to be sent to W. V. HARDWICK, Secretary, Grantham.

SEAMEN'S Hospital (late "Dreadnought"), Greenwich, S.E.—DISPENSER required. Must be a properly qualified Dispensing Chemist and reside in the Hospital. Salary £40, and an additional £20 per annum as Electrician, with board, furnished rooms, and attendance. None but those who can produce certificates as to sobriety and moral character need apply. Applications, stating age, which must be between 23 and 35, and giving all particulars, together with copies (not originals) of recent testimonials, to be sent to the undersigned on or before Tuesday, 31st October next. By order.
Seamen's Hospital, W. T. EVANS, Secretary.
Greenwich, 16th October, 1882.

A JUNIOR ASSISTANT. Good home. Plenty of time for study. State age, salary expected, &c., R. CLAY, Chemist, Cromford.

APPRENTICE.—WIBMER & WARDLEY, Chemists, Tonbridge, have a vacancy for a well educated youth. Terms on application.

IMMEDIATELY.—In an inland watering place. A qualified ASSISTANT. Of gentlemanly appearance and address. Accustomed to the routine of a first-class business. Three assistants kept. Address (enclosing carte), giving age, height, salary required, and references, M. M. N., care of Messrs. Hodgkinsons, 198, Upper Whitecross St., E.C.

A QUALIFIED ASSISTANT, to proceed at once to China. Unmarried, good experience, and unexceptionable character. Apply by letter only, with full particulars, to DAKIN BROS., Cree Church Lane, E.C.

FOR two months.—An ASSISTANT for the mixed Drug and Grocery business. State full particulars and salary (out-doors), to JNO. BADCOCK & SON, Pharmaceutical Chemists, Barnard Castle, Durham.

GEO. E. PERRY, Pharmaceutical Chemist (by examination), 77, Hagley Rd., Edgbaston, Birmingham, has a vacancy for a well educated youth as APPRENTICE. First-class Dispensing business.

A JUNIOR ASSISTANT, in-door, with good address. Age about 21 or 22. One accustomed to a good country business preferred. Apply, stating particulars and reference, to ILIFFE & SONS, Pharmaceutical Chemists, Nuneaton.

EARLY in November.—A good active JUNIOR, who has had some experience in Dispensing. State age, experience, reference, and salary required (in-door). J. FAWCETT, New Ferry, Birkenhead.

ASSISTANTS WANTED.

A STEADY trustworthy JUNIOR, about 21 years of age. Must have been accustomed to a Mixed country business, and with a knowledge of Dispensing. State age, salary and references to J. SLADE, Tenbury.

ABOUT November 13.—An ASSISTANT. Age 20. References must be good, and some Dispensing ability is necessary. Apply, stating age, height, &c., personally if possible, to J. C. PARKES, Pharmaceutical Chemist, Hare St., Woolwich.

AT once.—A competent ASSISTANT, for permanency, who would accept 3 or 4 hours daily for study during the winter months as part salary. State age, height, salary, experience, and send carte and references, to W. T. HARVEY, The Central Pharmacy, Margate.

APPRENTICE.—J. L. DAVIES, Pharmaceutical Chemist, Hay, has a vacancy for a well-educated youth who has passed or is prepared for the Preliminary examination. Full particulars on application.

A RESPECTABLE, trustworthy young man as JUNIOR, for a Dispensing and Mixed Retail business in a midland county. Must be sober, steady, and obliging. Salary moderate. Apply personally to Mr. HARTSHORN, 24, Cropley St., corner of Cavendish St., New North Rd., N.

IMPROVER. Age about 17. One who has some knowledge of Postal and Telegraph duties preferred. For good class business in suburbs of London, with P.O. attached. Or a well educated youth might be taken as an APPRENTICE on advantageous terms. Apply to PHARMACIST, care of Hearon & Co., 5, Coleman St., E.C.

PUPIL.—There is a vacancy in an old established West-end Pharmacy for a PUPIL. He will be educated with the son of the proprietor, and have time for study, attending lectures, &c. Address, C. B. A., care of Mr. Andrews, 34, Leinster Ter., London, W.

AN ASSISTANT, about 24 years of age, for a light Retail and Dispensing business. One accustomed to Prescribe and Extract Teeth and who is desirous of a permanency preferred. Address, stating age, height, reference, salary required, and enclose carte, to be returned, W. WOOTTON, 33, Liverpool Rd., Islington, N.

A TRUSTWORTHY ASSISTANT, from 21 to 26, for a light Drug business. A permanency. No Sunday work. One acquainted with Dentistry preferred. Apply, stating age, salary required and reference, enclosing carte (which will be returned), to T. C. TURTON, Howden, Yorkshire.

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IMMEDIATELY.—A good Junior ASSISTANT. Accustomed to Dispensing and General Retail. Apply, stating age, experience, and salary required, to C. JACKSON, Chemist, Church Rd., Acton, W.

AN in-door ASSISTANT in brisk Retail and Prescribing business. Gentlemen desiring a permanency are invited to apply, personally if possible, at 44, Camberwell Rd., S.E.

A JUNIOR ASSISTANT. About 21. One who has had some experience in Dispensing. Apply by letter, G., 44A, Renshaw St., Liverpool.

AS JUNIOR. Not under 21. Must be a good Dispenser and well acquainted with the routine of a first-class Retail. State age, height, and salary required. BRADLEY & BLISS, Reading.

A COMPETENT ASSISTANT, immediately. A Junior kept. State age, references, salary required, and full particulars. In-door. Address, A. J. EVANS, Chemist, Dorchester.

ASSISTANTS WANTED.

AN ASSISTANT. About 24 or 25 years of age. Apply, enclosing carte, stating age, height, &c., to H. AMOORE, Bournemouth. A Minor man preferred.

NATHL. SMITH & CO., Cheltenham, require an ASSISTANT of general experience in good class business. Please state age, height, salary, and reference to last principal.

IMMEDIATELY.—Junior ASSISTANT. In-doors. About 21. Of good appearance and manners. Accustomed to Dispensing. State height, age, salary required, and reference, enclosing carte de visite (to be returned). Address, W. SMEETON, 26, Commercial St., Leeds.

ASSISTANT for West-end house. Four kept. Qualified and accustomed to good class business. Age not under 23. Apply, A. B. C., care of Barron, Squire & Co., Bush Lane, Cannon St., E.C.

ABOUT November 7th.—An ASSISTANT, not under 21. To give his whole time. Hours 8 till 10, with alternate Sunday duty. One only kept. Salary £35. Apply personally, or with carte, stating age, height, reference, &c., to W. G. TAPLIN, 75, Hampstead Rd., N.W.

A QUALIFIED ASSISTANT. Age not under 30. Must be a good Counterman and Prescriber, able to Extract Teeth, and possess good references. Address, CHEMICUS, 2, Bath Parade, Bristol.

A JUNIOR ASSISTANT, or IMPROVER, for light country business. Ample time for study. Apply, stating age, height, references, &c., to R. W. PEACH, Donington, near Spalding.

ABOUT the middle of November.—A competent, trustworthy Senior ASSISTANT, for the country. Those need only apply who can give first-class references. Must be a good Dispenser and an energetic man of business. A decided Christian preferred, and an interview if possible. Apply, stating full particulars, to J. R. D., Barclay & Sons, Farringdon St., London.

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A JUNIOR ASSISTANT, about 20 years of age. Please state age, height, and salary required, carte de visite to be enclosed (which shall be returned). Address, G. WINDEATT, Wellington, Somerset.

A GENTLEMANLY ASSISTANT in a good class country business. Must write a neat hand and be a good Dispenser. Age not over 23. Apply, stating full particulars, enclosing carte and references, to R. H. GROVES, Pharmacist, Blandford.

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PARIS.—In a first-class establishment, a Dispensing ASSISTANT is required, speaking French. No one need apply whose character and antecedents will not bear the strictest scrutiny. A liberal salary is offered in return for experience. Good address and serious business habits. Enclose carte (to be returned) with references, to CHIMICUS, Library, 224, Rue Rivoli, Paris.

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ASSISTANTS WANTED.

WHOLESALE.—A young man, accustomed to Wet or Dry Counter. Address, stating experience and salary required, Messrs. MACKEY, MACKEY & Co., 1 & 2, Bouverie St., Fleet St., E.C.

IMMEDIATELY.—Out-door Junior ASSISTANT. One speaking French would be preferred. Apply personally to SCHOUVER, Chemist, Princes St., Hanover Sq.

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IMMEDIATELY.—In fashionable suburb, West of England. Rising neighbourhood. A small high class BUSINESS. A good opening for a gentleman of small capital. Best prices. Shop well fitted. Large plate-glass window. Good house, with garden, pleasantly situated. Easy terms. No agents. BERTER, Buckingham Vale, Clifton.

BUSINESS. Established by owner 1862. No reasonable offer refused. Light Retail, Prescribing, ready-money trade. Corner shop. Well fitted. Convenient house. Coach-house and 2-stalled stable. Rent low. Can be had on lease. Situated in a thickly populated part of Southsea. Immediate possession. An opportunity seldom met with, and purchaser can be accommodated. Apply, Mr. HAYLES, Chemist, Landport.

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No charge is made to purchasers.

PARTNER WANTED,

WITH Capital and Time, to assist in the development of a well-known Patent Medicine. A young man with energy would find this worth his notice. Apply to T. B. Morton, Queenstown, Co. Cork.

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AT the Mart, on Wednesday, November 1st, 1882, at 2 o'clock, by order of the Exors. of the late Mr. C. Adolphus, M.E., Turkish and Electric Bath Establishment, known as "The Royal York Baths," 54, York Ter., Regent's Park, N.W. It comprises a spacious building on two floors, containing 19 bath rooms completely fitted and furnished, a suite of Turkish bath rooms, handsome waiting and consulting rooms, and 6 capital living rooms, all on the first floor. Ground rent £5. Lease 39 years. May be viewed and particulars obtained of A. H. Crowther, Esq., Solicitor, 53 & 54, Chancery Lane, W.C.; at the Mart; or of the Auctioneers, Messrs. Harman & Matthews, 35, Walbrook, E.C.

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1882. SIXTEENTH SEASON.

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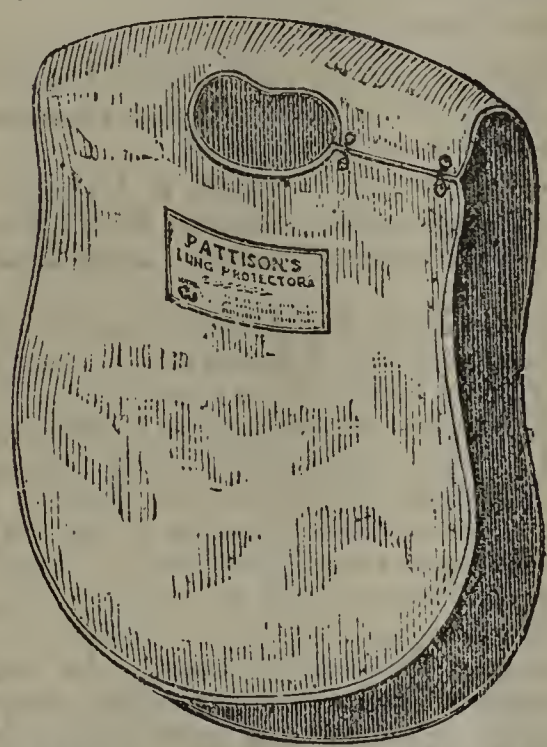

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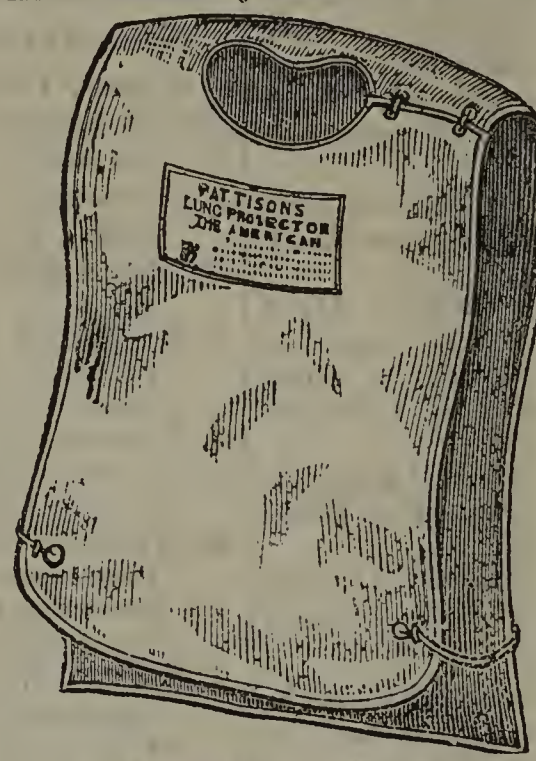

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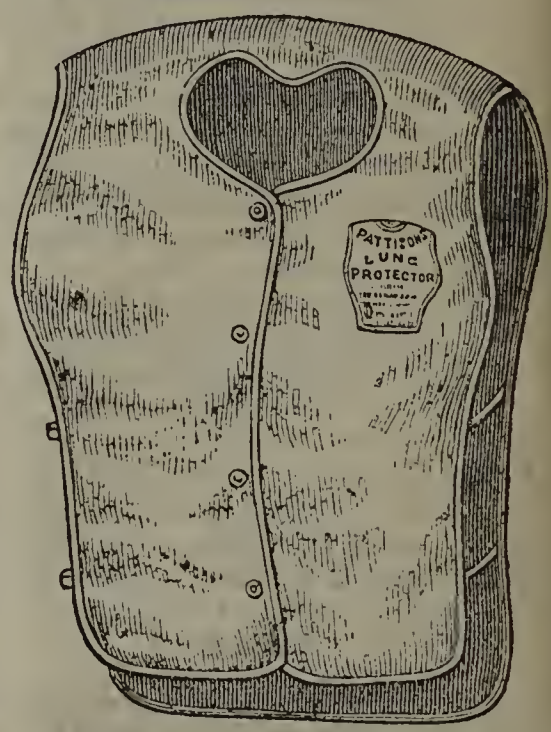

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All in Scarlet and White, and made in same Wool as the "Lung Protector."

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At lower prices than above, and equal to BEST of other makers, but are NOT recommended.

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AND
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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, November 1st, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

The following paper will be read:—

"The Orchard Alum Spring." By Dr. THRESH.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

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Persons subscribing on or before the day of Election will be entitled to vote thereat.

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These meetings will be resumed on the evening of Wednesday, November 8th, at half-past eight o'clock.

Country Members or Associates desirous of contributing papers during the Session are requested to communicate with the Secretary of the branch.

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THE CHEMISTS' BALL.

BY permission of the Council of the Pharmaceutical Society, a Meeting will be held at 17, Bloomsbury Square, on Monday evening, November 6th 1882, at 9 p.m., for the purpose of making Preliminary Arrangements for the ensuing ball. Any gentleman desirous of becoming a Steward, and unable to be present, will oblige by informing the Honorary Secretary without delay if such is his intention.

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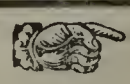

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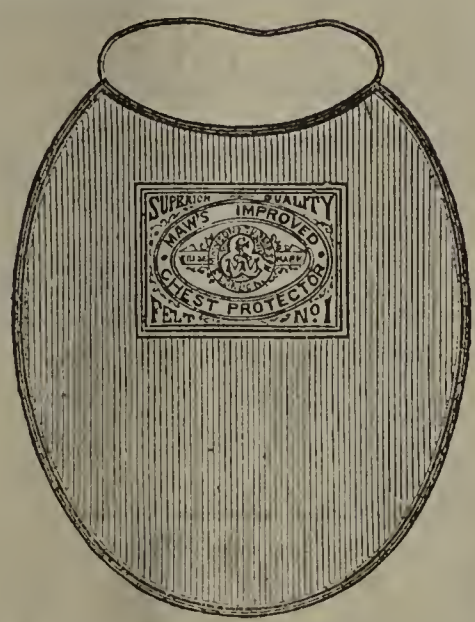

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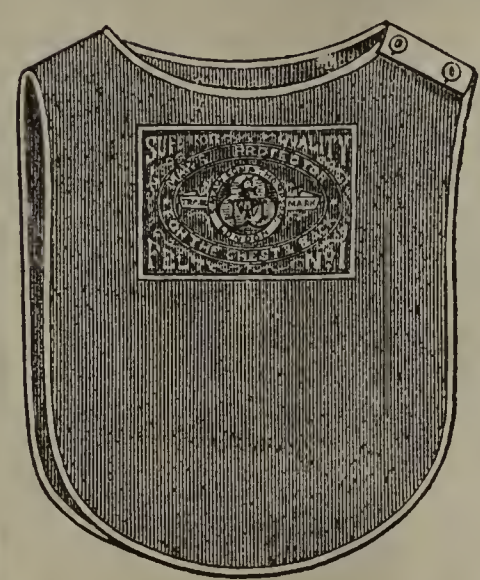

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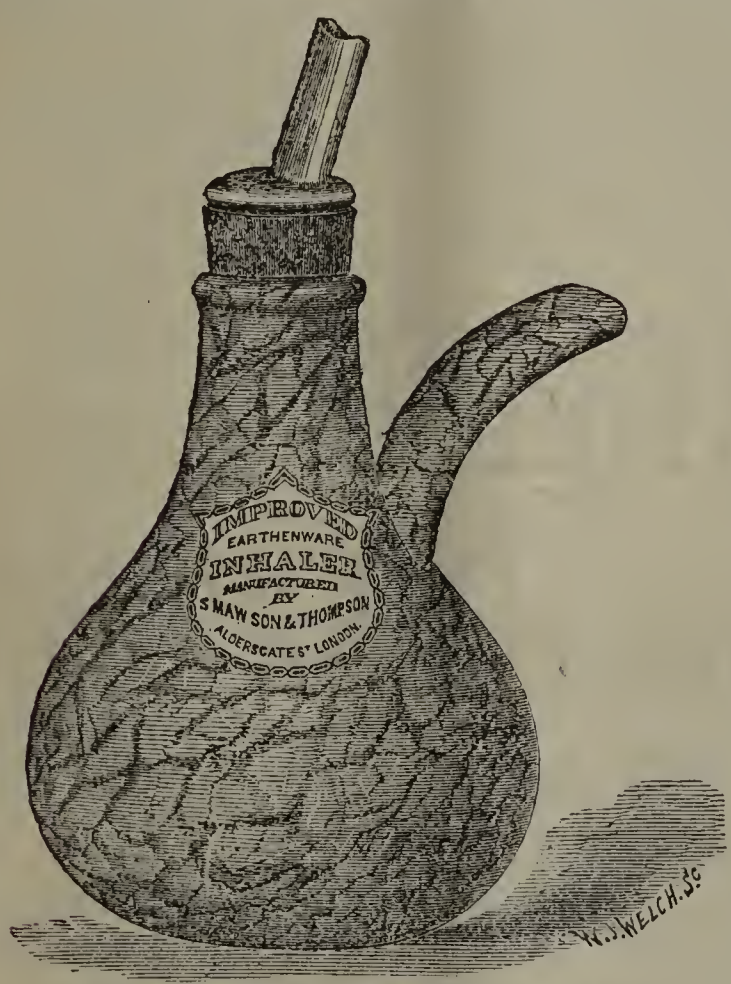

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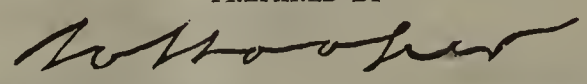

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"THE MONTH."

The recent gale and rain have produced quite a wintry effect on botanical gardens, denuding the trees of their foliage, and rotting the blossoms of the already limited number of autumnal flowers. The fruits of many medicinal plants may, however, still be observed in good condition. At the Botanical Gardens, at Regent's Park, the dulcamara grows side by side with a variety of *Solanum nigrum* (var. *miniatum*), with orange-red berries and another variety with yellow berries, the red ones look so like red currants that it is fortunate these varieties are not common, or cases of poisoning by *S. nigrum* would be more common than they are. Only last week another case of poisoning by the berries of *Solanum nigrum* occurred, this time in the north of London, but the child recovered after the administration of sulphate of zinc. As few as three or four berries have been known to produce sleep, and Dr. Taylor, in his work on Poisons (1875, p. 677), records the occurrence of a death from eating the black berries of this plant. The deaths which have resulted from eating these berries have been thought by some to have been caused by belladonna, which had been confounded with it. In the present case, however, there can be no doubt about the plant, the berries being stated to have been of the size of currants and to have grown in a London garden. The fruit of belladonna when black is as large as a black cherry. This plant (*S. nigrum*) certainly deserves chemical investigation to determine whether it contains solanine or some other alkaloid, and at the present time of year the berries could be procured in considerable quantity for the purpose.

About two years since, Dr. Harley, in an article that was reproduced in this Journal (vol. xi., p. 437), affirmed decidedly that there was no warrant for the generally accepted opinion that fool's parsley (*Æthusa Cynapium*) is poisonous. Some results of an investigation reported by M. Tanret to the Paris Pharmaceutical Society, at a recent meeting, fully bear out Dr. Harley's statement (*Journ. Pharm. et Chim.*, [5] vi., p. 325). M. Tanret says that he has failed to find in fool's parsley any alkaloid, glucoside, or other body, to which the reputed poisonous action of this plant could be attributed, and that physiological experiments gave equally negative results. He is, therefore, of opinion that fool's parsley is non-poisonous. M. Tanret has also observed that malic acid, which is rather abundant in the roots of fool's parsley, is replaced in the aerial parts of the plant by fumaric acid; vegetation would, therefore, in this case appear to produce upon malic acid the same effect as heat.

The carbohydrates contained in Ceylon moss (*Sphærococcus lichenoïdes*) form the subject of a communication by Mr. H. G. Greenish to the *Archiv der Pharmacie* (xvii., 241). Instead of confining his attention to one constituent, the author has endeavoured to ascertain what carbohydrates enter into the composition of the drug, to what extent they resemble or are identical with similar substances contained in phanerogams and to what extent they are present. He finds that the gelatinizing constituent (named by Payen "gelose") is a carbohydrate convertible by boiling with dilute acid into arabinose and probably identical with a similar constituent in the agar-agar of commerce; the latter differs from pararabin (its identity with which was asserted by Reichardt) in its insolubility in cold dilute hydrochloric acid. In addition to the gelatinizing constituent (36·7 per cent.) the drug appears to contain mucilage (2·7 per cent.), starch, metarabin (1·32 per cent.), wood-gum (3·17 per cent.), cellulose (identical with that of phanerogams, 10·17 per cent.); and further a carbohydrate, provisionally termed paramylan by the author, dissolved by dilute acid but differing from Reichardt's pararabin (which is extracted from phanerogamous plants in a similar manner) in being directly convertible into sugar and then yielding not arabinose but a fermentable sugar, probably grape-sugar. This substance is present to the amount of about 6·5 per cent. and appears, as the author remarks, to be deserving of closer investigation.

The observation that diastase is present in ungerminated corn was made by Dubrunfaut, and found confirmation in the discovery by Gorup-Besanez of a diastatic and peptone-forming ferment in vetch seed. Since then diastatic ferments have been reported to have been met with in various starchy and oleaginous seeds, potatoes, turnips, the buds of trees and other parts of plants. An investigation has now been undertaken by Dr. K. Nachbaur having for its chief object to determine what part of the corn grain is the seat of the diastase, the embryo being the part chosen for the first experiments and the grain used being Russian rye (*Monatshefte*, iii., 673). He has failed, however, to obtain from the finely powdered embryo any body capable of converting starch paste into sugar or coagulated albumen into peptone, and he draws the conclusion that the diastatic ferment observed in species of corn is not contained in the embryo. Qualitative and quantitative determinations of the embryo gave results corresponding perfectly with the statement of vegetable physiologists that it consists of protein substances, fat, cellulose, sugar, ash and water, but contains no starch.

It is, perhaps, not generally known that Dicotyledonous plants do not invariably consist of two entire cotyledons. Bentley and Hooker in the 'Genera Plantarum,' describe the genus *Bursera* as having cotyledons, "*interdum trifidæ, in una specie hippocrepiformæ.*" A specimen of the seeds of *Bursera microphylla*, collected at Arizona, near Maricopa, and cultivated at the Botanic Gardens of Harvard University, shows this species to possess cotyledons biternately dissected into linear lobes. The second pair of leaves are simpler than the cotyledons, the secondary lobes being fewer and short, while the next succeeding are pinnately divided into seven leaflets, thus approaching in character the adult form of leaf, which is pinnate with numerous very small leaflets, on an interruptedly margined leaf (Proc. American Academy of Arts and Sciences, xvii., 230).

Scientific botanical terms are often condemned as the dry bones of an otherwise interesting study; but even these may sometimes have points of interest. This is the case with the word *hilum*, of which, under the head of *Hilus renis*, Professor Hyrtl writes:—"The word *hilus* is, I must say, a barbarism, for it was only known to the Romans as *hilum*. They understood by the *hilum*, according to Festus, *id quod grano fabæ adherent*, that is, the *macula nigricans* on the concave border of beans. From the nature of this little spot, the Romans would talk of any trifling matter as not worth a

hilum, *ne hilum*, contracted to *nihilum*, and through the latter term to *nihil*."

Cinchona cultivation appears to have a promising future in Jamaica. In the report on the public plantations and gardens in Jamaica for the year ending September 30, 1881, just issued, the energetic director, Mr. D. Morris, states that 330,000 seedlings and 49,000 plants had been distributed during the year, besides a considerable quantity of seed, whilst the number of plants remaining in the nurseries at the date of the report is estimated at 178,000. Of these about seven-eighths were *C. officinalis* plants; other kinds represented being the "*Uritusinga*" variety of the same species, *C. Calisaya*, *C. Ledgeriana*, *C. succirubra* and a "hybrid." One of the most important of these would appear to be the supposed "hybrid," which for some years received particular attention under the impression that it yielded yellow bark, the true *C. Calisaya* having been wrongly looked upon as a form of *C. officinalis*. The plant is said to be hardy and a remarkably free grower, and it is believed by Mr. J. E. Howard to closely resemble *C. officinalis*, var. *Uritusinga*, a point that Mr. Morris hopes to clear up shortly. Meanwhile it is interesting to learn that a sample of trunk bark from this "hybrid," analysed by Mr. Howard, yielded 6·0 per cent. of quinine alkaloid, 0·73 per cent. of cinchonidine, 0·10 per cent. of cinchonine and 0·03 per cent. of quinidine. The plant which, as mentioned before, was by mistake included under *C. officinalis* has been identified both by Mr. J. E. Howard and Mr. Morris as true *C. Calisaya*, and samples of trunk bark from it yielded upon analysis to the former gentleman 3·7 per cent. of quinine alkaloid, and to the latter 5·38 per cent., together with a little cinchonidine, cinchonine and quinidine.

In one of the papers read before the British Pharmaceutical Conference at York last year, Mr. Greenish gave the results of an examination of some samples of jalap tuber grown in Jamaica. In the report above mentioned, Mr. D. Morris gives some further details as to this interesting experiment in acclimatization. The land devoted to the growth of jalap in Jamaica during the period stated was five acres, and the crop of green tubers harvested weighed 3400 lbs., and yielded 1077 lbs. of cured jalap. The principal difficulty appears to have been met with in the drying. The smaller tubers were dried whole in the sun, and although a considerable proportion of them was lost through fermentation and mouldiness, the result was considered to be on the whole satisfactory. The larger tubers were sliced or gashed, and in the drying of some of these an American fruit dryer was successfully utilized, although the operation required to be carefully conducted to prevent alteration of the starch grains. According to information since received from Mexico, the jalap tubers after being uprooted are in that country soaked for four hours in water saturated with lime and then dried in the sun. Afterwards they are covered with blankets for three days and then again dried; this is said to prevent them from moulding. One consignment of the Jamaica grown tubers was sent to London, and two others were sent to New York. Some objection seems to have been raised in the former market to the slice form, although the slices really contained the largest proportion of resin, but not in the latter. The returns did not amount to enough to pay the cost of the experiment, but another attempt is to be made and it is to be hoped that Mr. Morris's perseverance will meet with the reward it deserves.

In Sicily the Cavalière d'Amico has succeeded in acclimatizing *Cinchona succirubra*, *Indigofera tinctoria* and *Myrica cerifera*, the latter being the plant yielding the bark known to herbalists in this country as bayberry bark (*Nature*, p. 186).

About eighteen months since (*Pharm. Jour.*, xi., 897) Herr Teegarten published some notes on a sample of Bulgarian opium that contained 8 per cent. of morphia. The same chemist has recently had some other samples of opium produced in the principality submitted to him, which appear to have shown a considerable improvement in morphia strength. One sample from the Küstendil district presented exceptional characters. It was in lumps weighing 120 to 300 grams, had an unusually strong smell of opium and tasted very bitter. It was well dried, yielding 92·37 per cent. of dried opium, and 19·15 per cent. of morphia, or calculated on the dried drug 80·73 per cent. A sample from the Lowtscha district gave 89·61 per cent. of dry opium, and 11·90 (or 13·28) per cent. of morphia. Another, from the Halitz district, gave 89·14 per cent. of dried opium, but this yielded only 7·25 (or 8·13) per cent. of morphia. The amount of ash was very low, ranging from 2·69 to 2·85 per cent. There appears to be some uncertainty as to the extent of opium production in Bulgaria whilst the principality was under Turkish dominion; but Herr Teegarten has been informed that nearly the whole of it was used by local pharmacists, any surplus being bought by Jews and Turks at low prices and carried to Constantinople, where it was sold as Turkish opium.

The occasional bad quality of drugs offered in the drug market is notorious among those who have to buy them wholesale, and at a recent drug sale called forth severe comment. This month, no less than 1½ ton of ipecacuanha was put up for sale, which was so covered with mildew that very little else was to be seen except the contour of the root. This reduced the price of the drug from 5*s.* to less than 2*s.* The question which naturally occurs to those concerned is, what will become of all this? Will it be washed and offered for sale again, or will it be exported to India, where the drug is used as a sheet anchor in dysentery, or will it find its way into the army and navy stores after it has been cleaned and "polished up equal to new?" Ipecacuanha root when examined under the microscope may often be found to contain fungoid threads, and this fact and the variable quality of the wine made from the drug indicates the probable correctness of the supposition that damaged drugs are not destroyed in this country, but actually enter into commerce. This is a matter into which Government should look. It would have nothing to lose and much to gain by the appointment of an inspector whose duty it would be to examine imported drugs and to condemn and see that those unfit for use are destroyed. It is a matter no less important than the inspection of food. At the present moment it is said that owing to the scarcity of hops, quassia, chiretta and calumba are going up in price, and that spent hops which have been used in brewing in this country are being dried and exported to the Continent. In the United States the appointment of a Government officer for the inspection of drugs

has almost entirely stopped the previously large exportation of inferior drugs to that country.

In a letter to the *British Medical Journal* (p. 714), R. W. W. complains of being much annoyed by constantly meeting with worthless specimens of cannabis indica and hyoscyamus. He remarks that there are always worthless drugs in the market, and medical men would do well to test their action more frequently than they do. It may also be asked, what becomes of the poisonous Japanese star-anise that is so frequently offered in large quantities, of the false buchu, of the worthless yellow cinchona bark, and of numerous other spurious or very inferior drugs?

Dr. Squibb gives some valuable results obtained by himself in experiments with aconite (*Ephemeris*, i., 123). He considers it a good test of the quality of the root, if eight out of ten roots, broken across the middle, give a tingling taste when a minute fragment is bitten off and chewed for a moment between the front teeth. He remarks concerning the alkaloids that pseudaconitine has a less tingling taste and more of a peppery heat in it, and is about ten times stronger than aconitia. In one European specimen of aconitine, the taste was so bitter that Dr. Squibb believed it to consist chiefly of a decomposition product, picraconitine. The relative strengths of four samples of alkaloids compared by him with a standard solution were as follows:—Aconitia of unknown maker, 1; Merck's aconitine, 8; Merck's pseudaconitine, 83; Duquesnel's aconitine, 111. He further remarks that the last-mentioned produces a very different impression on the mouth from that of either of the other aconitias and from that of the root of *A. napellus*, causing in a greater degree the tingling element which commences almost immediately, while that of pseudaconitia is delayed from five to ten minutes. It also diminishes rapidly, which is not the case with pseudaconitia. The paper is full of valuable information and deserves a careful perusal.

In a communication to *Ephemeris* (i., 116) Dr. Reiter states that he has had personal experience of the value of the seeds of the common burdock (*Arctium Lappa*) in the relief of psoriasis inveterata. The preparations used were made by steeping the seeds in whisky, or dilute alcohol. Dr. Squibb recommends for the former to place one pound of well-crushed fresh burdock seeds in a bottle with one gallon of good old whisky, and keep in a warm place, occasionally shaking it, for a fortnight. The maximum dose of the clear tincture is 4 fluid drachms, well diluted, three times a day immediately after meals; when the dose is a large one whisky is recommended as a menstruum, but for smaller doses proof spirit is preferred. Dr. Reiter considers the therapeutic action of the tincture to be that of an alterative stomachic and says it appears to improve all the nutritive, secretive and assimilative functions. This use of burdock is by no means new, the root being used by herbalists in this country as a common remedy for skin diseases. Gerarde in his 'Herbal' quotes the statement of Columella that it is good for the king's evil. In Japan the plant is cultivated as a vegetable under the name of "gobo," and, according to information furnished by Professor Kinch, grows much larger and finer than in this country. The root and the petioles are used for this purpose. Several varieties of the plant are known, and are called by the names of the districts in which they are cultivated. From the occurrence of the seed among Japanese drugs it may be presumed that it is employed medicinally in that country. Gerarde in his 'Herbal' figures *Xanthium strumarium* under the name of "the lesse burre docke," and remarks, "It seemeth to be called Xanthium of the effect, for the burre or fruite before it be fully withered being stamped and put into an earthen vessel and afterwards when need requireth the weight of two ounces thereof and somewhat more being steeped in warm water and rubbed on maketh the hairs of the head red; yet the head is first to be dressed or rubbed with niter as Dioscorides writeth," a statement which suggests the idea that this plant might have been used by the ancient Greeks to dye the hair of the much prized colour, ξανθὴ κόμη, a term applied to the hair of Achilles and other heroes.

In the *British Medical Journal* (p. 719) Dr. E. Mackey calls attention to the value of salicylate of soda as a remedy for tonsillitis, and in cases of gout as a local application, the salt being, at the same time, also given internally in 10 grain doses every four hours. He sometimes orders the salicylate of soda to be dissolved in liquor ammoniæ citratis, with which, he states, it should form a clear colourless solution, which agrees well with patients; but he adds, "When dispensed by some chemists, I have known it turn brown and cause irritation and vomiting." This probably results from the natural acid being used in some cases and the artificial in others; at all events the point requires to be cleared up by experiment.

Professor Rapon has published (*Wien. med. Wochensch.*, No. 30 and 31, 1882) an account of further experiences of the value of naphthol. He states that when patients suffering from scabies are once rubbed with an ointment of naphthol, and then well powdered and covered with woollen clothing, the cure is often effected in a single day. His formula for the ointment is—lard, 100; soft soap, 50; naphthol, 15; creta alb. pulv., 10 parts. In prurigo also this remedy is highly recommended, a 5 per cent. ointment being used. In eczema a very weak ointment is applied, as the naphthol proves very irritating; and in prolonged cases simple ointment is substituted every fourth week to avoid any possible risk of absorption (*Brit. Med. J.*, p. 750).

The *Lancet* (p. 540) calls attention to the successful use of ergot in reducing enlargement of the spleen. In a severe case, in which the spleen nearly filled the abdominal cavity, the reduction was effected by this remedy in a fortnight. In this case, 3 drops of the fluid extract were given three times a day.

Dr. Froumuller, of Fürth, recommends tannate of cannabine as an excellent hypnotic, stating that its use is free from danger; that it does not disturb the secretions, and if the dose be suitable does not produce intoxication (*Med. Press and Circular*, p. 268). He administers it in doses commencing at 1½ grain in powder, mixed with sugar, or dissolved in water by the aid of a small quantity of alkali.

Experiments made by Hillier (*Zeits. f. kl. Med.*, September; *Med. Press and Circular*, p. 268) show that hypodermic injections of colocynthin, citrullin and cathartic acid produce too much pain to be of any value in therapeutics, whilst aloin administered in the same way does not cause this inconvenience, but is very unreliable.

M. Melsens, having observed that persons suffering from pulmonary disease derive good effect from the emanations of carbonate of ammonia in the atmosphere of stables, conceived the idea that a moderate inhalation of the vapour of this salt might be useful in other affections of the respiratory tract, and tried it on himself, after a serious attack of bronchitis, by suspending from his neck a little bag containing small pieces of that salt. From the first day relief was felt, and the cough soon disappeared entirely. Further experiments showed that this remedy gave relief also in cases of chronic bronchitis (*Med. Press and Circular*, p. 337).

Dr. Brown-Séquard has recently (*Nature*, p. 557) made the interesting discovery that in certain animals complete local anæsthesia of the larynx, accompanied by incomplete general anæsthesia, may be obtained by directing on to the upper part of that organ a rapid current of carbonic acid during a period of fifteen seconds to two or three minutes. The anæsthesia lasts from two to eight minutes after stopping the current. Dr. Séquard proposes to experiment on the human subject by introducing carbonic acid through the mouth or nostrils. This singular action of the acid may perhaps throw some light on the sedative action of aerated waters in vomiting and nausea.

In a paper on the treatment of chronic ringworm (*Brit. Med. Journ.*, Oct. 7, p. 682) Mr. Alder Smith recommends a preparation made by dissolving 10 parts of oleate of mercury in 90 parts of heavy petroleum oil as the most efficacious parasiticide he knows for chronic ringworm. He states that he has found it less liable to decomposition than the ordinary preparation of oleate dissolved in oleic acid and less irritant to the scalp. For children under seven years of age, if the 10 per cent. solution be found too strong, it can be further diluted with ordinary petroleum.

Sulphur ointment is suggested as a simple remedy for *Bacterium decalvans*, to which Dr. Thin attributes alopecia areata. In a number of cases described by Dr. Thin in the *British Medical Journal* (p. 784) the application of this ointment was found to result in preventing the spread of the disease, which it cured, a growth of down taking place within a month after commencement of the treatment. This action of sulphur may possibly explain the apparently beneficial results obtained by the use of various hair lotions containing sulphur. Dr. Thin, however, considers that the fat mechanically prevents the growth of bacteria on the surface of the scalp, while the sulphur acts destructively upon them. If further confirmation of these results be obtained, it seems probable that sulphur pomade may in future become a regular article of stock for pharmacists.

Some interesting facts have recently been collected by M. D'Abaddee to show that sulphur emanations exert a marked influence on malaria (*Lancet*, p. 676). In Sicily the labourers in the sulphur works in plains where malaria is common enjoy an almost complete immunity from intermittent fever, only 8 or 9 per cent. of the villagers suffer from it, while of those in neighbouring villages not engaged in this occupation 90 per cent. are attacked. According to M. Fouqué, the city of Zephyria, situated in a marshy plain where it is impossible to pass the night without being attacked with ague, dates its decadence from the discontinuance of the sulphur workings formerly carried on in its vicinity. Three hundred years ago the city was said to have forty thousand inhabitants, but when the sulphur works were given up paludal fever gradually destroyed the population, so that twenty years ago only two hundred inhabitants remained. In the portion of the marshy plain of Catania where sulphur works exist the inhabitants suffer but little, while a village not far off is deserted. Elephant hunters in Ethiopia are said to enjoy an almost complete immunity from the disease through using a fumigation of sulphur daily. Dr. Thin's results, and the known value of sulphur in destroying the fungus which attacks the hop, seem to point to the need of ascertaining to what this anti-bacteric action is due, whether to sulphurous acid, sulphuretted hydrogen, the vapour of sulphur itself or of some peculiar oxide of sulphur.

In the *British Medical Journal* (pp. 736, 786) Dr. H. Gibbes gives some further hints on the best mode of staining the bacillus tuberculosis for the microscopical examination of sputum, and points out possible sources of error which may occur if the sputum be not obtained under suitable circumstances, *e.g.*, if it comes not from the lungs, but from the throat, or if the chemicals used be not of a definite character.

The researches of Messrs. Schloesing and Müntz on the Continent, and of Mr. Warington in this country, have established the fact that the phenomenon of nitrification in the soil and in organic liquids is due to the action of microscopic organisms. On the other hand a communication recently made by Messrs. Gayon and Dupetit to the Academy of Sciences (*Comptes Rendus*, xcv., 644) seems to show that the inverse reaction, the reduction of nitrates, is also a physiological phenomenon. They state that when decomposed urine is added to sewage liquid, or neutralized chicken broth, containing 0·020 gram of potassium nitrate per litre, the nitrate gradually disappears and the liquid becomes full of microscopic organisms. If the mixture is sterilized by heat, or if chloroform or sulphate of copper be added, the action does not take place. But, very curiously, carbolic and salicylic acids, even in proportions considerably beyond those used generally for antiseptic purposes, do not retard the reduction; on the contrary, they are themselves attacked by the microbes and disappear with the nitrate. Under favourable conditions, at a temperature between 35° and 40° C., the fermentation is so energetic and the multiplication of the microbes so great that a gram of nitrate per litre is reduced daily. The gas given off is pure nitrogen; the oxygen remains in the liquor as carbonate. As to the organisms, they belong to the class called anaërobes by Pasteur, and when cultivated at the surface of the liquid, in contact with air, become inactive or nearly so.

Dr. Brockhaus, of Godesburg, has recently been experimenting (*Medical Times and Gazette*, p. 505) *in propriâ personâ* on the alcohols and allied bodies likely to occur in alcohol made from grain, with a view to determine the properties of each. It has long been known that alcohol containing fusel oil causes delirium tremens, while pure grape spirit is said not to do so. Aldehyde has a very powerful effect, persons who have drunk brandy highly charged with it falling senseless within a few minutes. To the presence of this substance Dr. Brockhaus attributes the intense and early intoxication produced by some new wines, which when

matured are harmless. Many cases in which the persons are supposed to have been drugged may be explainable in this way. Paraldehyde and acetal were found to resemble aldehyde, but the taste and effects are milder, though the latter last longer. Propyl and isobutyl alcohols seemed to exert less influence on the mental, but greater influence on the digestive functions than the foregoing; allyl alcohol, besides producing effects similar to amyl alcohol caused a weakness of the limbs approaching paralysis. This alcohol is said to be used in Germany to render spirit unfit for drinking, as the crude methylic is with us. Dr. Brockhaus says that as the ordinary modes of purification are inadequate to the entire removal of the liquids above mentioned the sale of potable spirits for other uses than in the arts should be forbidden.

Amylic alcohol is sometimes used as an alkaloidal solvent, but an observation made by Herr Haitinger (*Monatshefte*, iii., 687) seems to show that some circumspection is necessary in using it for this purpose in delicate investigations. Having occasion to examine an article of food for the presence of alkaloids he sought to separate any present by shaking it with amylic alcohol. From the alcohol, subsequently, a small quantity of substance was obtained as a deliquescent hydrochlorate, which gave the general alkaloid reactions with iodo-potassic iodide solution, but did not answer to any of the better-known poisonous alkaloids. This led to the closer examination of the amylic alcohol used, and upon shaking it with dilute sulphuric acid a small quantity of a basic substance was separated, and a similar result was obtained with eight out of nine samples of amylic alcohol from different sources. A larger quantity (2 kilograms) of "pure" amylic alcohol was then repeatedly shaken with dilute sulphuric acid, and the watery liquid concentrated and distilled with excess of caustic potash. The distillate was strongly basic, smelt strongly of pyridine, and eventually yielded crystals corresponding in appearance and composition with the platinum double salt of pyridine. From other samples different bases were obtained, one differing in odour from pyridine, boiling at a much higher temperature, and forming a platinum salt with a composition that seemed to indicate that the base was bivalent. Probably this difference in the alkaloids present in different samples finds its explanation in the varying materials from which amylic alcohol is derived. The proportions found ranged from 0 to 0·1 per cent., the average being 0·04 per cent.

Selmi, in prosecuting his researches on the alkaloids found in the human body, has come to the conclusion that in fatal cases from paralysis, tetanus, etc., death is due to poisons of an alkaloidal character, produced by the progress of the disease. He has found such bodies in the urine of patients suffering from these maladies (*Nature*, p. 568).

It has been pointed out by Mr. Pedler that some snake poisons are rendered inert by platinic chloride, possibly through the formation of an insoluble compound with the active principle of the poison, which has been said to be of an alkaloidal character. Confirmatory of this theory, Professor Henry Croft (*Chem. News*, Oct. 13, p. 165), writing from Texas where rattlesnakes are common, says that a favourite antidote to snake bites in that country is a strong solution of iodine in iodide of potassium, applied immediately to the wound, and a few drops taken inwardly. He states that he has had the opportunity of proving the efficacy of the solution in two cases of "cascabel" bites, one on a buck and the other on a dog, and he conjectures that the action might be due to the formation of an insoluble iodo-compound. Upon adding a drop of iodine solution to some of the white opaque poison taken from the fangs of a rattlesnake a dense light-brown non-crystalline precipitate was immediately formed, similar to that produced by the same reagent with several alkaloids.

M. Carles reports (*Répertoire*, x., 443) that in using Personne's test for the estimation of potassium iodide, which is based upon the amount of mercuric chloride that can be added to an aqueous solution before the formation of a permanent red precipitate, he has sometimes failed to obtain constant results with the same specimen of iodide. This he found to be due to the decomposition of the double iodide of mercury and potassium by water, which takes place in proportion to the extent of dilution of the solutions. He therefore proposes to substitute for water dilute spirit (containing 17·5 per cent. of alcohol), which he says he has found to give good results.

A new test for albumen in urine, which appears to be a convenient one, has been described by Dr. W. Roberts (*Lancet*, October 14, p. 613). It is based upon the fact that when albuminous urine is treated with a saturated solution of common salt, slightly acidulated, the albumen is thrown down as a dense white cloud. The test liquor is readily prepared by mixing a fluid ounce of dilute hydrochloric, sulphuric, acetic or phosphoric acid with a pint of water, saturating the mixture with common salt, and filtering. The precipitate is, in this case, not due to coagulation, it being redissolved by shaking, unless the brine be present in excess. The method of applying the test recommended is similar to that followed with the nitric acid test. A portion of the suspected urine is placed in a test tube, the tube is held aslant, and the salt solution is allowed to trickle along the side of the tube to the bottom, so that it may form a distinct layer; or the proceeding may be reversed and the urine added carefully to the salt solution. If albumen be present a white cloudy zone appears at the junction of the two layers, and the test carried out in this way is said to be as delicate as the nitric acid test. Unlike that test, however, it throws down peptones, if present, but not white clouds of urates. When there is resin in the urine, as in the case of patients taking copaiba resin, a cloudiness is produced, but this may be distinguished from albumen in not disappearing when shaken with excess of urine.

Attention has also been called, by Mr. G. N. Stephen (*Lancet*, October 14, p. 614) to an improvement on the nitric acid test, in the direction of the volumetric estimation of albumen in urine, due to M. Tanret. It consists in the precipitation of the albumen from the urine, previously acidulated with acetic acid, by means of a solution of double iodide of mercury and potassium. The formula for the solution, 0·05 gram of which is calculated to precipitate 0·005 gram of albumen, is—potassium iodide, 3·22 gram; mercuric chloride, 1·35 gram; water to 100 c.c. In applying the test 10 c.c. of urine is taken, into which 2 c.c. of acetic acid is stirred with a glass rod, and the test liquor is run in from a pipette discharging 0·05 c.c. at a time, until the

precipitate formed is no longer redissolved by stirring; when this point is reached, a drop of urine is taken after each fresh addition and placed in a watch-glass with a minute quantity of a 1 per cent. solution of mercuric chloride. The precipitation is completed when a yellowish-red colour is observed in the watch-glass, due to the formation of red iodide of mercury. The number of 0·05 c.c. added, after deducting three as having been used in excess, if reckoned as half-grams, will represent the quantity of albumen in a litre of the urine. The test may be affected by the presence of alkaloids in the urine, but the precipitate formed in consequence will dissolve either on the application of heat or the addition of alcohol.

A case of poisoning is reported from France (*Journ. Pharm. et Chim.*, [5], vi., 271), due to the substitution of a packet of barium chloride, kept for use in the analysis of plastered wines, for a packet of magnesium sulphate. About six grams were taken by a woman of middle age, and the effects were probably intensified by the fact that it was previously mixed with some hot broth. The acridity almost immediately drew attention to the mistake, and first an emetic was administered, then a saturated solution of magnesium sulphate and albumen mixed with water, followed by stimulating drinks taken internally and external rubbing with a mixture of ammonia and oil. The symptoms were vomiting and diarrhœa, general coldness, cramps limited to the lower limbs, and loss of sensation in the feet, which diminished in intensity in a few hours and disappeared in the course of the next day. There was, however, subsequent constipation.

The *Times* has given an abstract of a recent paper read before the Belgian Academy by M. Spring, on "The Origin of Thunderstorms." The author relates that in a hut on the Urenal (at a height of 2198 metres) he one night experienced a violent thunderstorm. There was, for about half an hour, terrific hail, without a single drop of rain, and whenever the hail grew momentarily more intense a vivid lightning flash occurred, and at the same moment loud thunder like the report of a powerful cannon. Before long some raindrops began to fall, and as they increased the flashes and peals became less and less frequent. M. Spring thus theorizes:—Each hailstone, of whatever size, is the result of union by regelation of many crystals of sleet. In this process an enormous free surface disappears in a body that is a non-conductor of electricity, viz., ice, and in presence of another non-conducting substance, viz., dry air. Experiment leads us to expect in such a process a large development of electricity, and to this has to be added electricity arising from friction of the hailstones with the air. Thus there would be a large number of electrified spheres near each other, and separated by an insulating medium, and these forming in some sort the surface of the region, should, according to Faraday's researches, acquire an electric charge equal to the sum of the charges of the central spheres; hence enormous electric tension in that superficial part, relieved from time to time by discharge between the hailstones and the air or the ground. It is stated that M. Spring supports his view by a variety of facts, observed both in Alpine regions and in the laboratory.

Professor W. F. Barrett read a paper at the recent British Association Meeting at Southampton "On the Alteration in the Dimension of the Magnetic Metals Produced by the Act of Magnetization." The author found that iron elongated ·00000368 of its length and that cobalt elongated ·00000235 of its length, while nickel contracted ·00000835 of its length. The volume of the nickel bar used appeared to undergo very slight shrinkage on demagnetization amounting to less than one ten-millionth of the whole volume of the bar. The author states that the "magnetic tick" was heard well with nickel and cobalt, with the latter especially so, the sound on making and breaking contact having a sharp metallic ring. It is suggested that this fact indicates the desirability of trying cobalt and nickel for telephone receivers. Further experiments are in progress to determine the effect of longitudinal tension and of temperature on the change of dimensions of the nickel and cobalt.

The Gas Committee of the Birmingham Town Council has just published one of the most valuable and elaborate reports that has yet been drawn up by any municipal body on the burning question of gas *v.* electric lighting. The report commences with an expression of opinion that the experiment of supplying electricity from a common centre, if tried in Birmingham, should be conducted under the most favourable circumstances, and that every facility should be afforded for it, consistent with the public convenience, welfare and safety, and without being hampered by any question as to the possibility of other interests being affected by its success. But the Committee has arrived at the conclusion that at present the advantages to be gained by the experiment of distributing electricity will not compensate for the loss and inconvenience which must follow the breaking up of the streets for this purpose in the busiest part of the town. The report proceeds to discuss (*a*) monopolies; (*b*) control of the streets; (*c*) profits on undertaking. Under the last head is quoted Mr. Crompton's statement in his evidence before the Parliamentary Committee on the Electric Lighting Bill, that no remunerative return was to be expected during the first seven years at least of the experiment, as well as a statement made by Mr. Gainsford, in a recent debate in the Sheffield Town Council, based upon experience gained in collieries with which he is connected, that electricity cannot be produced at the cost of gas, even when the motive power is provided free. Estimates of Dr. Siemens for a quarter of a square mile area, and of Mr. Crompton, Dr. Hopkinson and Mr. Johnson for one square mile area are given. Dr. Siemens allows 24,000 to 30,000 incandescent lamps in his area and 70 arc lamps, and estimates the cost at £100,000; the other authorities allow 50,000 incandescent lamps and give the cost as £200,000. Nearly all the witnesses agreed that nothing but a large experiment from a common centre would properly determine the question of cost. In another part of the report, it is stated that the prime cost of the conductor from Messrs. Winfield's works to the Town Hall, about 500 yards in length, amounted to more than £800 or equal to £3000 a mile, without services. This sum appears tremendous, and until something is done to reduce the cost of this essential of electric lighting progress will be retarded very greatly. The Committee has framed estimates for the supply of gas and of electricity for the Market Hall Ward, covering an area of 1000 yards square and using at a moderate computation 120,000 lights.

The cost of gas works, mains and services for this consumption is stated as £170,000 as a maximum and £100,000 as a minimum. The cost of electric light plant for about 100,000 lights is given as £423,500. The cost of meters is left out in both statements, as it is not known that a practical electric meter has been devised. The report concludes with a number of practical suggestions, the main drift of which is that it is not advisable for the local authority to apply for powers of supply, but that the Committee be authorized to enter on negotiations with the companies applying for such powers.

PRECIPITATES IN FLUID EXTRACTS.*

BY J. U. LLOYD.

(*Concluded from page* 326.)

After a precipitate has formed in a tincture or a fluid extract it is generally accepted as permanent. All will admit that precipitates often continue to deposit for months and even years, but I cannot find it recorded that they disappear. It is true, however, that a line of precipitates may form and then decrease in size, only to form and waste away again. This growth and reduction is readily understood when we consider the cause of their production, and to do this I beg leave to refer to my last communication on this subject (Proceedings for 1881). I there called attention to the fact that a percolate was a mixture of solutions, and that continuous precipitation resulted after the percolate was mixed from inability of the mixture to dissolve substances which were perfectly soluble in the fractions of the percolate at various stages of its production. From this reason I argued that with ordinary hydro-alcoholic menstruums we could not expect a line of permanent fluid extracts. This explanation, however, is insufficient to carry the production of precipitates beyond certain moderate periods, and we know from experience that the act of precipitation may continue indefinitely, independent of evaporation of menstruum. It has never been stated, that I can find, in connection with this point, that at intervals the precipitate to a greater or less extent will dissolve, yet such is the case. Were it otherwise, a point would be reached when all of the dissolved matter would be thrown from solution, and consequently no further deposition could occur.

To illustrate how precipitates may increase and decrease, let us suppose that a fluid extract of senna has remained in an even temperature until an equilibrium has resulted and the menstruum is capable of holding in solution every particle of the dissolved matters which remain above the sediment; perfect rest will now result and precipitation cease. A change in solvent power of the solution must take place before further precipitation can follow, and a change of temperature will be followed by either decreased or increased solvent power, and consequently by more or less precipitation, or re-solution of the precipitate.

Let us accept the former, that there is a decrease of temperature after a precipitate has ceased to form under a constant temperature. Another precipitate will result which is entirely different from the former, and this precipitate can to the greater extent redissolve in the menstruum when the temperature increases. This precipitate during the low temperature settles to the bottom of the bottle, and upon an increase of temperature redissolves, giving us a dense layer of solution upon the bottom of the bottle. The solvent properties of this layer of solution differ from the liquid above, and as a consequence certain portions of the precipitate previously cast down will dissolve. This dense warm liquid acts upon other constituents of the precipitate, and as these dissolve the solvent power of the solution changes and other portions of the precipitate dissolve until finally a considerable amount of the precipitate has disappeared. During this time circulation of the liquid has formed, perhaps, more than one stratum at the bottom of the container, and then by the circulation I have exemplified in my previous experiments, there is a starting upward of this lower solution, and a downward motion of the upper. Finally, a condition will be reached in some portion of the liquid where, by the intermingling of the lower and the upper solutions, certain principles that were dissolved from the precipitate will become insoluble. This state is usually indicated by a cloudiness at the point of contact of two stratums, and the result is the formation of a precipitate. This precipitate will continue to form until the composition of the liquid within the container is again uniform and the strata have disappeared. Such a final state of affairs can only be reached under an unchanged temperature, and we know that under ordinary circumstances an even temperature for any length of time is impracticable. As a consequence we may expect to have more or less of strata in our containers, and repeated precipitation and re-solution. Our precipitates will come and go with the changes of temperature, and there can be no rest. Thus is explained, as I stated at the commencement of this article, how "continuous precipitation may be taking place without depleting the liquid of dissolved matters, and may continue for an indefinite period."

There is some difficulty in accurately studying the above-named phenomena, unless the experimenter will select some article that will yield much extractive and little colouring matter, but all who have observed the action of fluid extracts and examined their precipitates at different stages will recall many instances where the foregoing description of phenomena can be applied. In connection with this subject I shall now introduce the notes of an experiment which illustrates the formation of a precipitate by the gradual admixture of different portions of a transparent percolate, and which will show us the workings of the strata currents under ordinary conditions.

May 5, 1881. Eight troy ounces of powdered capsicum were properly moistened with dilute alcohol and packed in a cylindrical percolator. The receiving vessel was an ordinary 2-gallon bottle. Into the mouth of this the percolator was inserted, and to the exit of the percolator a rubber tube was attached. This tube extended to the bottom of the bottle, and the lower end of it was fixed to a cork, so that as percolation progressed the floating cork would hold the exit of the tube at the surface of the liquid. By this arrangement the percolate was collected in the order obtained and without mixing, the lightest liquid being on top.

Description of Percolate.—The percolate passed transparent from the beginning until the end of the act of percolation. The lower portion of the liquid was dark red in thin section, black as viewed in bulk. From the upper part of this dark layer the colour became gradually less and less in shade, until it passed to a light straw colour. This point was reached at a height of 4 inches above the dark layer; the remainder of the container (6 inches) was of a uniform light straw colour, and doubtless would have remained so had the act of percolation been continued for days. This percolate consisted then of three parts, a lower solution rich in dissolved matters, a central solution, where there was a marked and rapid decrease in colour from below upward, and an upper liquid of uniform colour; the proportion being as 3, 4 and 6. Undoubtedly the bottom of the lower section was most concentrated, although the colour of the first 3 inches of solution was so deep as to forbid a comparison by the colour test. However, the entire percolate had two points of distinct division, one where the colour rapidly decreased from dark red to light red, and the other where the change was rapid from light red to yellow.

Changes.—The container was retained in the laboratory

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

in the position where the act of percolation was accomplished. In two hours from the time of the cessation of percolation a muddy layer of liquid appeared between the dark red (lower) and light red (overlying) solutions. In four hours the entire light red percolate was muddy; in six hours it had resolved itself into three sections, each with distinct lines of demarcation. After twenty-four hours particles of yellow precipitate appeared abundantly in the upper of these sections and gradually settled to the surface of the second section; here there was a retardation of the motion of the particles and a diminution in the amount of precipitate, but finally it collected in large particles and fell through the second dividing plane. As the precipitate passed through this second section it decreased and finally entered the heavy dark lower liquid, *where it entirely dissolved.* After seven days the three central strata had resolved into two sections and had become transparent, throughout which were clots of precipitates. The upper portion of the liquid in the bottle was very muddy, and gave rise to a constant rain of precipitates that gradually settled through the lower strata, dissolving as they passed, until only a very small amount reached the bottom of the bottle. These appearances were maintained for ninety days, at which time the liquid in the bottle had become transparent and of one colour and composition, the strata and lines of demarcation had disappeared, a uniform yellow precipitate covered the bottom of the bottle, and a layer of oil globules overspread the surface of the liquid.

Analysis of Phenomena.—The examination we have given the changes which occurred in the tube makes this example simple and readily understood. The percolate from the capsicum formed a liquid in the bottle that was concentrated at the bottom, and which became dilute with more or less regularity as we passed towards the surface. This association of different liquids under the influence of change of temperature resulted in the formation of strata, and each stratum was circulating upon the principle of those of our tube, excepting that, as the temperature changed regularly over the surface of the entire cylinder, the circulation was from the outside of each section towards the centre of the bottle. This circulation even without the aid of diffusion gradually transferred the various portions of the liquid, effecting an even mixture.

Cause of Precipitation.—By referring to our article in the Proceedings of this Society for 1881, it will be found that when different portions of ordinary percolates are mixed precipitation is likely to result. Now, the precipitate under present consideration followed from the usual cause, a mixing of percolates. The concentrated solution at the bottom of the bottle was gradually transferred to the dilute solution above, and *vice versâ.* This caused a precipitation of substances insoluble in the new solvents, and as the greatest change or strain results from the rapid dilution of the heavy solution, precipitation was most rapid at intermediate parts or the upper portion of the liquid.

Re-solution of the Precipitate.—It will be noticed that after the precipitate was formed in the upper part of the liquid, it disappeared as it progressed towards the bottom of the bottle. This re-solution resulted from the fact that the lower strata were solvents for bodies that the upper could not hold in solution. Hence the gradual formation of the precipitate in the upper part of the bottle was followed by the re-solution of the larger part as it slowly settled towards the bottom. Indeed, after seven days had passed these aggregations of precipitate in the third stratum were in pieces as large as the first joint of the little finger, but these for a long time were almost entirely dissolved in their passage through the underlying strata, only reaching into the top of the lower liquid. It must be remembered that the lower solution gradually became more dilute, and that finally its solvent action was so decreased as to permit more or less of the precipitate to reach the bottom of the container.

The points I desire to present in this paper as a step further in our study of fluid extracts may be summed up as follows:—

We cannot hope to produce by percolation a line of permanent fluid extracts or tinctures, for most percolates will precipitate more or less owing to aforementioned causes, even without a change in temperature. Theoretically this precipitation, if we could maintain an unchangeable temperature, would continue until an equilibrium was established, and then the liquid could hold in solution all the dissolved principles. However, an unchangeable temperature is not practical under ordinary circumstances, hence it follows that occasionally the sediment is increased by a precipitation which results simply from low temperature. This precipitate will redissolve when the temperature increases, the solution formed may act upon and dissolve more or less of the precipitate already present, and this stratum of liquid by diffusion and circulation will reach the upper portions of the container, to be altered in composition and precipitate again. Thus we find that from natural causes precipitation in fluid extracts made by percolation may continue indefinitely, and that these precipitates may periodically continue to increase or decrease, and that there is little chance for absolute rest. It follows also that even though we may prepare a fluid extract with great care and shake the same until it is a uniform mixture, after a period it may be very different at the top and bottom of a container. This is explained by the fact that after a decrease of temperature a precipitate is formed, then an increase of temperature redissolves it, giving a lower stratum of liquid, perhaps *very* rich in some proximate principle.

There are other phases connected with this subject, and, from the manner in which my last article to the Society was received by pharmacists and manufacturers of pharmaceuticals, I am let to believe they would prove very interesting, but to consider them at this time would lengthen the paper and perhaps make it wearisome.

COMMERCIAL BISMUTH PREPARATIONS.*

BY PROFESSOR P. W. BEDFORD.

At the time this query was accepted (as even now) the United States Pharmacopœia of 1870 was the guide by which this query should be replied.

The writer has, however, made his experiments in the light of the more exact and definite tests of the Pharmacopœia of 1880.

The impurities sought for were lead, copper, silver, arsenic, alkaline earths, ammonia, chlorine, sulphuric acid.

Besides the salts, the writer examined specimens of metallic bismuth, one sample being from the new Australian source.

As the examination was so thoroughly satisfactory as to the medicinal quality, no enumeration will be made as the results of the examination of each individual maker, but the results may be embodied in a general statement. This may be stated as follows:—That each of the samples of subnitrate and subcarbonate of bismuth examined are fully equal to the requirements of the Pharmacopœia of 1880; that in none of the specimens examined is there any lead, copper, silver, chlorine, or sulphuric acid. By a more rigid test than the United States Pharmacopœia exacts, there were traces of ammonia in two samples, in all there were traces of alkaline earths or salts, both due, undoubtedly, to imperfect washing of the precipitates in process of manufacture, yet in both the quantities were so minute, that they were practically not noticeable in an analysis beyond "a trace."

The same may be said about arsenic, though in this a quantitative determination was made. The amounts present of arsenic varied from less than $\frac{4}{10}$ grain to 3 grains in 1000 grains.

The specimen of Australian bismuth gave evidences of a trace of copper and arsenic, but neither were estimated.

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 28, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DR. GREENHOW'S REPORT ON THE EXAMINATIONS.

THE reports presented annually to the Privy Council by the visitors appointed under the provisions of the Pharmacy Act, 1868, to attend the examinations conducted in London and Edinburgh, always command respectful attention, not only because they are the embodiment of official opinion as to the manner in which the Pharmaceutical Society performs the important duty confided to it in the interest of the public, but also because the reporters are gentlemen of mature experience, intimately acquainted with the nature of the work to be done by the examining boards, and at the same time viewing it from a position outside purely pharmaceutical influences. It was, therefore, natural that when the latest report of Dr. GREENHOW, through the courtesy of the Lords of the Council, came under the notice of the Pharmaceutical Council at its recent meeting, it should give rise to considerable discussion, though possibly some of the speculations as to what Dr. GREENHOW might or might not mean to imply in the last sentence, concerning a subject upon which he just previously declares his intention to defer offering an opinion, may turn out to have been superfluous. There is, however, plenty that is definite and unmistakable in the report which is worthy of the most careful consideration.

As in previous years, Dr. GREENHOW gives to statistics a prominent place in his report, and these are the more acceptable because they furnish some details, respecting the subjects in which failures occurred, not published elsewhere. Referring first to the Preliminary examination, he points out that the percentage of failures in 1881 was unusually large, amounting to 56·8 per cent. of the 1187 candidates examined. This unfavourable result he does not attribute to an excessive stringency of the examination, but to the very inadequate early education of the candidates, an opinion which certainly finds corroboration in the fact that by far the largest proportion of failures was in arithmetic. Moreover, large as was the percentage of unsuccessful candidates, it may be said to find a parallel in the case of the Oxford and Cambridge Local Examinations. According to the joint annual report on this subject, recently issued by the Universities, the number of candidates who presented themselves at the different centres in the past year was 734, and of these 350, or nearly 48 per cent., failed to obtain a certificate. But it appears that one out of every three of the successful candidates had already passed the examination on a previous occasion, and if this be taken in consideration in connection with the fact that the candidates as a rule are scholars selected from various schools on account of their presumed fitness, it will be seen that the indication furnished by the Universities Local Examinations as to the quality of the middle class education throughout the country is hardly more favourable than that given by the Preliminary examination conducted under the provisions of the Pharmacy Act.

The fact that there were more than 50 per cent. of failures in the Minor examination, Dr. GREENHOW attributes, as in former years, to the very defective training the men had received during the three years they had passed in a chemist's shop prior to presenting themselves. Unfortunately it is too true that many of the candidates have had but "scanty opportunities for practically learning to read prescriptions written in Latin or to dispense and compound medicines;" but this is mainly attributable to a condition of affairs over which pharmacists have little control, namely, the relative absence in many cases of that portion of their work which they are supposed to have been specially trained to perform. The report gives the number of failures in the different subjects of the Minor, from which it appears that chemistry was by far the weakest subject, whilst the failures in prescription and practical dispensing, notwithstanding the defective training commented upon, were comparatively few. However, it must be remembered that the figures quoted only partially reveal the facts, since a candidate who fails to a certain extent is not carried further, and therefore they must necessarily be affected by the order in which the subjects are taken. In respect of the Major examination also, the figures quoted show that the largest proportion of failures was in chemistry.

Dr. GREENHOW abstains from offering any comment at present on the proceedings of the Council in respect to the report of the Special Committee appointed to consider the relation to each other of pharmaceutical education and the pharmaceutical examinations, and contents himself with alluding to the recommendations and pointing out that the first two adopted, providing for a three years' apprenticeship or pupilage, and the previous passing of the Preliminary examination, are in accord with views expressed by him in previous reports. With respect to the fourth recommendation, as to the division of the Minor examination into two parts, it may be remarked that although Dr. GREENHOW is quite correct in saying that it was not adopted, the opposition to it was not based upon disapproval of the principle that there should be such a division,

but was directed chiefly against some alterations that had been introduced as to the manner in which it should be carried out.

EXTRA-JUDICIAL UTTERANCES OF CORONERS.

A CASE reported on another page well illustrates the capricious manner in which every now and then a coroner oversteps his proper functions and inflicts such a penalty as is involved in censure by a prominent public officer upon no other basis than his own notion of what the law is or ought to be. In this case, in the course of an inquiry as to the cause of death of a man, who it was at first erroneously supposed had died from the effects of poison, it came out that he had been supplied by a chemist and druggist in Belfast with an ounce and a half of laudanum. The seller had not only complied with the requirements of the law as to labelling, but had exceeded them by making inquiry as to the purpose for which the poison was required and had received a reasonably satisfactory answer. This, however, did not satisfy the coroner, and having first alleged that the law provides that the name and address of the buyer shall be taken in the case of a sale of laudanum, and been corrected, he then affirmed that it ought to be done. If Dr. DILL thinks that laudanum should be included in the first part of the poison schedule he has a right to say so, and he belongs to a class of functionaries whose opinions upon such a subject are entitled to respect, but his expression of opinion involved an act of injustice, inasmuch as it took the form of an unwarranted censure of a person who had even exceeded the precautions with which Parliament has surrounded the sale of laudanum, when sold as such and not as a patent medicine. The suggestion that a chemist and druggist should sell a diluted article while taking the price of one of full strength, if made by Dr. DILL, as reported, is beneath criticism, even if such a practice has the sanction of custom in surgeries. But it would seem to show that he must be ignorant of the existence of another public functionary, whose opinion in respect to such a practice would be of greater importance than even that of a coroner.

THE INSTITUTE OF CHEMISTRY.

LAST week a meeting of members of the Institute of Chemistry was held in Birmingham. The proceedings commenced on Friday morning with a visit to the alkali works of Messrs. CHANCE and Co., where the new process of sulphur recovery invented by Messrs. SCHAFFNER and HELBIG (see *Pharm. Jour.*, xii., 969) is in operation, and another to the Earl of DUDLEY'S Round Oak iron works.

In the evening the members dined together at the Great Western Hotel, under the presidency of Professor ABEL. In responding to the toast of the evening, Professor ABEL traced the history of the Institute, which he said had had its origin seven years ago in the want that was recognized by a considerable section of the Chemical Society of an organization through which the status of the profession of chemistry could be definitely established, and he expressed an opinion that although the present was only the sixth year of the existence of the Institute, the Fellows might venture to believe that its future prosperity and utility to the profession were fully secured.

On Saturday, the meeting was brought to a close by visits to Messrs. CHANCE'S Glass Works, the Corporation Gas Works, the Birmingham Mint, and Messrs. ELKINGTON'S electro-plating works.

THE NEXT EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, November 1, when a paper will be read on "The Orchard Alum Spring," by Dr. THRESH. The chair will be taken at half-past eight o'clock.

CHEMICAL SOCIETY.

THE first meeting of this Society for the new session will be held on Thursday next, November 2, when the following papers are to be read:—"On some Halogen Compounds of Acetylene," by Dr. R. T. PLIMPTON; "On Dihydroxybenzoic Acids and Iodosalicylic Acids," by Dr. A. K. MILLER; "Crystalline Molecular Compounds of Naphthalene and Benzene with Antimony Chloride," by WATSON SMITH and G. W. DAVIS; "Additional Evidence that Quinoline belongs to the Aromatic Series of Organic Substances," by WATSON SMITH and G. W. DAVIS; "On Orcin and some of the other Dioxytoluols," by R. H. P. NEVILE and Dr. A. WINTER.

THE SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

IT affords us pleasure to call the attention of past and present students in the School at Bloomsbury Square to the announcement that the first meeting of the School of Pharmacy Students' Association in the new session will be held on Thursday evening, November 16, when an address will be delivered by the President, Professor ATTFIELD. The Association is one that is entitled to the best wishes of pharmacists, since it has for its object the encouragement of study and original work in the sciences upon which pharmacy is based, and there has also been founded in connection with it a "research fund" for rendering aid to students in the investigation of subjects of direct pharmaceutical interest. At a time when there is a marked dearth of first-class pharmaceutical research, as evidenced in the paucity of communications to the Evening Meetings of the Pharmaceutical Society and other bodies, both in town and country, associations which, like this one, foster a taste for original investigation among the rising generation of pharmacists, are doing most useful service.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October, 1882.

Present on each day—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

Dr. Greenhow attended on the 19th and 26th, on behalf of the Privy Council.

October 18.

MAJOR EXAMINATION.

Eight candidates were examined. *Six* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Fletcher, James Edward.....Saltley.
Foden, Edwin .....Eccles.

MINOR EXAMINATION.

Seventeen candidates were examined. *Twelve* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Betts, Charles Ernest Oscar ...Woodbridge.
Bray, William .....Redruth.
Brough, Frank Thompson .....Northampton.
Cardwell, Augustus .....Derby.
Cooper, Harry Stanley .....London.

MODIFIED EXAMINATION.

Three candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Colvin, John Thomson .....Bodmin.

October 19.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

MacDermott, Robert John.....London.
Parker, William Henry .....Hitchin.

MINOR EXAMINATION.

Twenty candidates were examined. *Twelve* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dadson, Horace Charles .....King's Lynn.
Deacon, Frederick George .....Frome.
Dodsworth, Martin .....Harrogate.
Dunn, George Stewart .....Landport.
Dye, Charles Page .....Bury St. Edmund's.
East, William Alfred .....Princes Risboro'.
Fawssett, Theodore .....London.
Gummow, James Freeman.....London.

October 25.

MAJOR EXAMINATION.

Seven candidates were examined. *Two* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Roper, Robert Francis.....East Stonehouse.
Rouw, Theodore John.....Ruthin.
Steel, Alexander .....Torquay.
Thornley, Frederick.....Devizes.
Wakefield, John .....Birmingham.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Sixteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Heynes, Thomas Edward .....Maidenhead.
Maddox, Frank Walter .....Ealing.
Millward, Rowland Donne.....Ashbourne.
Norman, William Francis .....Towcester.
Rees, David .....Haverfordwest.

October 26.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Thirteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hudson, Tom .....Wells.
Pell, Alfred .....Wisbeach.
Pinchen, William John .....Norwich.
Prothero, George Rees .....Pontypridd.
Rees, Rice William .....Swansea.
Robertson, John .....Aberdeen.
Salmon, Ernest Frederick .....London.
Surman, Thomas William .....Bristol.
Tottle, Henry John .....Bath.
Treharne, Frederick Gwilym...Weston-super-Mare.
Yates, George Albert .....Manchester.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Hathaway, Fredk. Hy. Wm. ...Lydney.
Hemens, Frank.....Hutton,
Wookey, Lionel .....Bath.

Certificate of the Incorporated Law Society.

Lewis, Rees Martin ....Cheltenham.

Certificates of the University of Cambridge.

Chater, Arthur Brand .....Elmdon.
Corder, Edward .....Norwich.
Harrison, Rd. Caswell Clark ...Birmingham,
March, Thomas Frederick .....New Brompton.
Midgley, Walter .....Keighley.
Shenton, Arthur Holland .....Birkenhead.

Certificates of the University of Oxford.

Minchin, William.....Bedford.
Oldershaw, John .....Nottingham.
Wyatt, Harold .....Bootle.

EXAMINATIONS IN EDINBURGH.

October, 1882.

Present on each day—Messrs. Ainslie, Baildon, Clark, Gibson, Gilmour, Kinninmont, Nesbit and Stephenson.

Professor Maclagan was present on the 19th, on behalf of the Privy Council.

October 18.

MAJOR EXAMINATION.

One candidates was examined, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Wright, Robert.....Buxton.

MINOR EXAMINATION.

Twelve candidates were examined. *Seven* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Alexander.....Dumbarton.
Cobden, Alfred George .....London.
Cunningham, John James .....Cambuslang.
Law, Thomas Wm. Thorburn...Falkirk.
McNeilage, Alexander.....Greenock.

October 19.

MINOR EXAMINATION.

Thirteen candidates were examined. *Eight* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Moore, Frank Philip .....Aberdeen.
Ombler, William Henry .....Windsor.
Rowand, Robert .....Glasgow.
Watson, Robert William.....Maryport.
Young, William Ferguson .....Elgin.

PRELIMINARY EXAMINATION.

The undermentioned certificate was received in lieu of the Society's Examination:—

Certificate of the University of Edinburgh.

Pirie, John .....Edinburgh.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Wednesday, October 25, 1882, the report of the College of Preceptors on the examination held on October 3rd was received.

Two hundred and forty-eight candidates had presented themselves for examination, of whom *one hundred and seventeen* had failed. The following *one hundred and thirty-one* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically.)

Abbott, Herbert E. Tripp .....Lowestoft.
Allan, Hy. Wemyss F.....Glasgow.
Arthur, Arthur.....Carmarthen.
Baker, Wm. Weaver .....London.
Barnes, Fredk. Walter.....London.
Barstow, William .....Marple.
Beale, Charles Henry .....Chard.
Bennet, Andrew R. .....Uphall.
Bennett, Albert Edward .....Leigh.
Bertram, David Paul J. .....London.
Birrell, Robert .....Forfar.
Bones, Arthur Anderson .....Manchester.
Booth, George Hy. W.....Alfreton.
Bransby, Chas. Kirby .....Manchester.
Brook, Thomas Turner .....Elland.
Bugden, William Beale .....Blandford.
Burton, Robert Charles .....Kendal.
Bygott, John William.....Huddersfield.
Caldwell, John.....Edinburgh.
Campbell, Peter, jun. .....Leven.
Carrie, Robert Smith .....Kirkcaldy.
Cartwright, William Henry ...Whitchurch, Salop.
Chatterton, Benjamin .....Sheffield.
Clarkson, Thos. Edward .....Wibsey.
Clatworthy, Wm. Jno. Hicks ...Saltash.
Cobb, Herbert Ernest .....Bury St. Edmunds.
Cornell, Henry Currie.....King's Lynn.
Crockett, Henry .....East Grinstead.
Cullwick, John Henry.....Birmingham.
Cupit, Alfred Henry .....Loughborough.
Curtis, Joseph Levi .....Huntly.
Dalton, Edwin T.....Hull.
Darnbrough, Arthur.....Southport.
Dean, John Thomas.....Haslingden.
Denny, John Harvey .....Woodbridge.
Donald, John Martin .....Perth.
Duncan, William .....Elgin.
Edmondson, Thomas .....Cockermouth.
Eyval, Thomas Brown.....Edinburgh.
Felton, William .....Maidstone.
Forsyth, Ebenezer .....Edinburgh.
Fowler, Geoge Ross.....Edinburgh.
Freeman, Thomas .....Beverley.
Funnell, Richard .....Whitlesea.
Gaddes, Andrew .....Penrith.
Graham, Joseph .....South Shields.
Gregson, Joseph .....Manchester.
Griffiths, Charles John .....Shanklin.
Griffiths, John Egbert.....London.
Grime, James .....Darwen.
Hall, Alfred Eves.....Sevenoaks.
Hanson, Arthur William.....Devonport.
Hendry, Fred. Harry .....Hull.
Hendry, Robert Love .....Edinburgh.
Heyhoe, Horace James .....Swaffham.
Holt, James Hartley .....Ormskirk.
Hornby, Louis Francis .....Great Harwood.
Hucklebridge, Wilfred .....London.
Hudson, George Charlton .....London.
Hudson, James.....Dumbarton.
Hughes, John .....Carnarvon.
Hull, Robert S. .....Sunderland.
Hurst, Herbert Frederic R. ...Colchester.
Jones, David Lloyd .....Eglwyswrw.
Jones, Richard Alan .....Holyhead.
Jones, Thomas .....Swansea.
Jones, Thomas .....London.
Jones, Thomas John .....Holyhead.
Lewis, John Lloyd .....Llandyssul.
Lloyd, Walter George .....Cardiff.
Lobbett, James Godfrey.....Hingham.
Lomax, William Henry .....Darwen.
Lowe, Albert John .....Guernsey.
McDonald, James .....Lochee.
McKilligin, Hay Grant .....Portsoy.
McMurtrie, John .....Glasgow.
Mahood, Trevor Corry .....London.
Marsh, Charles David .....Devizes.
Mason, John Henry.....Wirksworth.
Massey, Samuel Jeffrey .....Purston.
Miller, Alex. Sunderland .....Edinburgh.
Mills, William Henry .....Walsall.
Milton, William, jun. .....Edinburgh.
Moir, William Sinclair .....Aberdeen.
Morley, William Henry .....London.
Morrison, Andrew .....Glasgow.
Morrow, George .....Hornsea.
Mossop, Henry.....Whitehaven.
Nicholson, John.....Broughton-in-Furness
Noyes, Edward T. .....Wokingham.
Owen, Henry .....Carnarvon.
Owen, John Lewis ..... Holyhead.
Palmer, Frank Hermann .....Hull.
Park, John .....Aberdeen.
Payne, Charles Frederick .....Ramsgate.
Peck, Henry Fredrick.....London.
Peebles, Thomas Smith .....Dundee.
Pennington, John Noble.....Ulverston.
Perrett, George Stanley .....Bath.
Porter, Caleb Thomas Geo.....London.
Potter, Herbert Mills .....Walsall.
Prosser, Evan Charles .....Colchester.
Raine, James Arthur .....Over Darwen.
Reid, Neil .....London.
Reith, Alexander .....Aberdeen.
Ridley, Albert Paul.....Ipswich.
Roberts, Alfred Dean .....Lincoln.
Rudd, Henry Bulmer .....Bradford.
Rutter, William .....Masham.
Seccombe, Maurice Otto .....Tavistock.
Smith, John Henry .....Coventry.
Spry, Richard .....London.
Thirsk, Arthur Thomas .....Hull.
Thomas, James.....Newcastle Emlyn.
Thomas, Joseph .....Garstang.
Thompson, Henry Clarence ...Belford.
Underwood, George.....Whitby.
Veitch, Alexander .....Edinburgh.
Vivian, Richard .....Penzance.
Walton, James Thomas .....West Hartlepool.
Weir, Robert.....Campbeltown.
Wells, Thomas Peter .....Blackburn.
Whitmore, William Fryer .....Hoddesdon.
Whitworth, James William ...Oldham.
Wilkes, Thomas .....Shrewsbury.
Williams, David .....Cardigan.

Williams, William Pierce .....Llanberis.
Wilson, James B. .....Nottingham.
Wilson, Joseph Harwood .....Wigan.
Wright, Charles Rowland .....Portsmouth.
Yuill, Stephen .....Belfast.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	9	5	4	Inverness	2	1	1
Birmingham	9	4	5	Lancaster	6	4	2
Brighton	1	1	0	Leeds	14	5	9
Bristol	6	2	4	Lincoln	6	1	5
Cambridge	4	0	4	Liverpool	9	4	5
Canterbury	4	2	2	London	39	19	20
Cardiff	9	2	7	Manchester	20	12	8
Carlisle	3	3	0	Newcastle-on-T.	3	2	1
Carmarthen	7	5	2	Norwich	7	6	1
Carnarvon	7	6	1	Nottingham	9	4	5
Darlington	2	2	0	Peterborough	2	1	1
Dundee	7	4	3	Sheffield	4	1	3
Edinburgh	16	10	6	Shrewsbury	3	1	2
Exeter	7	4	3	Southampton	4	3	1
Glasgow	9	7	2	Truro	4	1	3
Guernsey	1	1	0	Worcester	3	0	3
Hull	6	6	0	York	6	2	4

The questions for examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English:—

(i.) Trium mensium molita cibaria sibi quemque domo efferre jubet. (ii.) Hoc toto prœlio aversum hostem videre nemo potuit. (iii.) Eos ita dicere: Non esse fas Germanos superare, si ante novam lunam prœlio contendissent. (iv.) Hoc prœlio trans Rhenum nuntiato, Suevi, qui ad ripas Rheni venerant, domum reverti cœperunt. (v.) Hoc prœlio facto, reliquas copias Helvetiorum ut consequi posset, pontem in Arare faciendum curat atque ita exercitum transducit. Helvetii, repentino ejus adventu commoti, quum id, quod ipsi diebus viginti ægerrime confecerant, ut flumen transirent, illum uno die fecisse intelligerent, legatos ad eum mittunt; cujus legationis Divico princeps fuit, qui bello Cassiano dux Helvetiorum fuerat.

2. To what classes of verbs do *potuit, consequi, transducit, fuit,* respectively, belong? Write in full the indicative perfect and subjunctive present of these verbs.

3. Give some rule for the use of the subjunctive mood.

4. Translate into Latin:—(i.) They had done Cæsar great injury. (ii.) Cæsar set out for Italy and came to Rome. (iii.) A river separated the two armies. (iv.) Who does not love peace more than war? (v.) Having pitched his camp, he waited till the enemy should attack.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

1. How many yards of carpet, 25 inches wide, will it take to cover a floor that is 19 feet 7 inches long by 18 feet 9 inches wide?

2. Multiply the sum of 1, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ by the difference of $\frac{4}{15}$ and $\frac{3}{20}$, and divide that product by the double of $21\frac{7}{9}$.

3. Multiply ·285 by 4·02; divide 2·961 by ·007; and find the value of 2·778125 of 6*s.* 8*d.*

4. If, after selling $\frac{3}{4}$ of an estate, I sell $\frac{2}{3}$ of $\frac{7}{9}$ of the remainder for $\frac{3}{5}$ of $\frac{7}{8}$ of £$200\frac{5}{8}$, what is the value of $\frac{2}{3}$ of the estate.

5. If a sack of corn, containing 1 hectol. 20 lit., cost 18 francs; what ought to be paid for a sack of corn of the same quality containing 1 hectol. 60 lit.?

III. ENGLISH.

1. Define *case.* What indications of it are there in English?

2. Give the perfect tense and past participle of the verbs *sew, read, throw, rise, lie, strive.*

3. Correct the following sentences, giving your reasons in each case:—

(i.) Neither of them had a sixpence of their own.
(ii.) Avoid those kind of things.
(iii.) Who did you give that book to?
(iv.) That was the man whom I saw was to blame.

4. Parse the words in italics in the following passage:—

"You take *my* house *when* you *do take* the prop
That doth sustain my house; you take my life
When you do take the *means whereby* I live."

5. Write a short composition on one of the following subjects:—"Waste of Time," "The Study of the Laws of Health," "Patience"; or give an account of some remarkable place or of some distinguished writer.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting was held in the Society's Rooms, on Wednesday evening, October 11. Mr. Preston, President, in the chair. There was a moderate attendance.

The minutes of the previous meeting were confirmed.

The President, after alluding to his pleasant visit to the Pharmaceutical Conference at Southampton, called upon Mr. Furness to read his paper on "Our Trade and Professional Interests."

Mr. Furness commenced his remarks by referring to the composite nature of the business of a chemist and druggist, and defined it as a mixture of the professional and trade elements, in which the latter greatly predominated. The trade element had been and was being assailed on all sides, and the dealing in a number of articles which used to lie almost exclusively in the chemist's hands had now been diverted into other and possibly more legitimate channels. But chemists could not be so indifferent now that the trade in drugs, patent medicines, specialties, sundries, dietetic articles, etc., was so seriously threatened. Simple articles, such as salts and senna, had long been supplied by small shopkeepers in villages and other places; but these persons had generally maintained the prices, and moreover the public had been able to recognize the superior quality of the articles sold by chemists. But now the trade was grievously assailed by large grocers, drapers, and "stores," who supplied patent medicines, and specialties, and nine-tenths of the Pharmacopœia, and even in some cases made arrangements to dispense prescriptions and deal in poisons at reduced prices. With respect to patent medicines and similar articles the public could not be expected to pay 25 or 30 per cent. more at one shop than they would at another a few yards off, but it was not to the interest of chemists to sell these articles at cost price. It was, however, useless to look to the Government, the Pharmaceutical Society or the Trade Association for the remedy of this vexed state of things. Chemists must rely upon their individual tact and learning to supply the income lost in this direction, and must rely upon their collective strength and exertions to destroy the trust the public had acquired for patent medicines. Chemists had made this trade assume the dimensions it had. They had recommended these "patents," kept them in stock, distributed hand bills, exhibited show cards, lent their windows for gratuitous advertisements, and now, having established them thus firmly, were entirely ignored, saving when some new enterprise was endeavouring to secure public

favour. But the same means that had been instrumental in building up this trade could be used in combating the evil, and if the proprietors would not help to maintain the interests of chemists they must combine to help themselves. As to the sale of drugs, there were many of the articles and preparations in the British Pharmacopœia which were not absolutely poisonous, but the supply of which still required supervision by a responsible person. This was illustrated by a case which had come under the speaker's notice, where a solid had been supplied for "sal volatile" and the buyer told to take two teaspoonfuls, resulting in the inconvenience attending the swallowing of about two drachms of carbonate of ammonia; and by another case where nitrate of potash had been supplied for Epsom salts. He was of opinion that the supply to the public of all the chemical and Galenical preparations, the mineral and animal substances and the majority of the vegetable products in the British Pharmacopœia, as well as the dispensing of prescriptions, ought to be exclusively in the hands of chemists and druggists, and he wished to see an amendment of the Pharmacy Act in this sense. It could easily be demonstrated that such an alteration would be for the public benefit, and it would be simple justice to a respectable and deserving body. This end could be best attained by joining the local associations, supporting the Trade Association, and influencing the constitution of the Council of the Pharmaceutical Society, both of these last-mentioned bodies possessing great influence if they could only be got to work in the proper direction. The speaker then briefly referred to the subject of pharmaceutical education. Although he considered the examinations were sufficiently comprehensive and stringent as compared with the position of the pharmacist, he was of opinion that if it were understood that all persons presenting themselves for instruction had previously attended a suitable course of instruction, it would strengthen the hands of the examiners, and they would be better able to make allowances and draw inferences with respect to the individuals coming before them. It was necessary there should be some suitable provincial education established, easily and cheaply procurable at recognized centres. If this could not be done to be self-supporting, some other scheme must be adopted. Arrangements might be made with the Science and Art Department, which had organizations in many provincial towns, or terms might be arrived at with such educational bodies as Frith College, Yorkshire College of Science, and Owens College, etc., to establish a course of lectures similar to those delivered at Bloomsbury Square. The reading of the paper was brought to a close by a reference to the relation of chemists and druggists to the public and the medical profession.

The President remarked that there was a large field for discussion, and proposed a vote of thanks to Mr. Furness for his valuable paper.

A discussion then followed on the various topics of the paper, in which Messrs. Ellinor, Newsholme, Lowe, Fox and Mould took part.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the above Association was held at the Royal Institution on Thursday, October 12, 1882, the President, Mr. Joseph Woodcock, in the chair.

The minutes of the last meeting were read and confirmed, and the following donations announced:—The *Pharmaceutical Journal*, from the Society; List of Foreign Correspondents of the Smithsonian Institution, from the Institution.

Mr. J. E. Saul was elected an associate.

Mr. Shaw showed an "Electric Gas Lighter." This instrument, which is said to be capable of lighting a gas jet thirty thousand times before it requires recharging, costs primarily 30*s*. If this statement is correct it will, therefore, be seen that, independently of the small cost of recharging, which is a few shillings, it is, for this purpose, very little more expensive than wax matches.

The President then delivered his inaugural address. After welcoming the members at the commencement of the thirty-fourth session, he referred to various causes that had tended to deprive the Association of some of the classes formerly represented in it and had somewhat altered its character. He then continued:—

"This probably places us in our true position as chemists and pharmacists, and we shall not fail to remain efficient, successful and self-existing, provided we supply papers, discussions and miscellaneous contributions calculated to advance our calling from a professional aspect. In the first place we must never lose sight of the fact that we are a recognized educational body, and that we should provide lectures in our School of Pharmacy for the education of our apprentices. We have hitherto done so, but it is requisite an adequate number of students should present themselves to defray the necessary cost, and in this we have not always been successful, more especially since the introduction of the much-to-be-lamented system of 'cram.' But let us hope its last days are numbered.

"The subject that has perhaps above all others occupied the attention of British pharmacists during the last twelve months has been the question of establishing a more satisfactory relationship between the education of embryo-pharmacists and their examination, and when the time arrives that a compulsory curriculum is enforced no doubt our school provision will be in demand. At the some time we may congratulate ourselves that we are not the only body that suffers from the same cause. The recent report of the Liverpool School of Medicine states that the members of the medical profession did not increase in equal ratio with the population; not only was there no increase, but a slight diminution in the numbers of students throughout the country, and the same statement applies to the numbers of those examined at Bloomsbury Square. No doubt this is caused by the increased stringency of examinations. But this should not deter us; we must rather advocate, and advocate strongly, a sufficiently compulsory curriculum as the test for education, rather than recognize the supply of a cursory, transient and superficial knowledge merely intended for the purpose of enabling the student to surmount an examination which otherwise would not be overcome.

"And here let us give a word of praise to Professor Attfield for his long-continued and successful endeavours to attain the desirable result that is now likely to be accomplished and crown his wishes. From the time he inaugurated the advocacy of a recognized compulsory curriculum at the Pharmaceutical Conference at Brighton, ten years ago, to the present, his exertions have been unceasing. His able, instructive and comprehensive speech at Manchester; his pamphlet, which he distributed amongst our own body broad-cast over the country, and which contained a very large number of arguments for the proposed change, that were practically unanswerable, all entitle him to our highest appreciation, warmest gratitude and sincerest thanks.

"I have read with much interest the long and able discussion of the Council of the Pharmaceutical Society upon the various recommendations their Committee had advanced with reference to the "Relation to each other of Education and Examination," and it is noteworthy that the subject was considered of such importance by the leaders of our profession that every member of the Council contributed thoughtful and powerful expressions of opinion on that occasion. But holding to a great extent the views of the majority of that Committee, I must confess myself disappointed at the rejection by the Council of the *fourth* recommendation. I have been very much pleased by the recent decision to refer the whole subject back to a committee for reconsideration, and personally I trust the fourth recommendation, or one similar to it in purport, will be finally adopted by the Council. There can be no doubt

that the student by concentrating his attention on a lesser number of subjects would be likely to attain a more thorough knowledge of all and acquire a more perfect acquaintance with their details.

"I am quite of opinion that the first portion need not necessarily be passed in London. At present few students think of systematically commencing their studies till they have completed their apprenticeship and attained their majority; they then rush off to the metropolis to avail themselves of those so-called educational systems and learn merely for the sake of passing their examination, without reference to that higher end to which examination should always be subservient, namely, the acquiring a thorough knowledge of their future calling with its allied sciences, and, the qualifying Minor surmounted, cast their studies on one side for ever. This first portion of the examination should, I consider, also be passed previously to leaving the master with whom the candidate has been articled, and before accepting a situation in London or elsewhere; a dominant idea being to attain London and gravitate towards the schools; this system already exists on the Continent, the employer being compelled to complete the education of his apprentice if he should fail in fulfilling the requirements of the examiners. It would not only stimulate young men to study hard during their apprenticeship, but would also compel their masters to take more interest in their pharmaceutical education. Numbers of employers only think of the work they can obtain from their apprentices, without fulfilling their covenants and teaching them the art and mystery of their profession. Many influential persons imagine that immediately an apprentice has passed his Preliminary he will devote himself during the whole period of his apprenticeship to qualify for the distant Minor; this unfortunately is not the case. Few lads at that age will, without great external pressure, begin a series of studies at such a long period anterior to the time when they will be eligible to present themselves for examination. When first apprenticed they are only too glad at having escaped the irksome trammels of school and are most unwilling to recommence a system of study, in addition to performing the practical work of their business.

"In speaking of the deficiency displayed by Minor candidates in their knowledge of dispensing, some have considered that the fault lay altogether in the very small number of prescriptions many of the students have been called upon to dispense during their apprenticeship. There is, no doubt, a considerable amount of truth in this belief, but I think the matter has been overrated. It is notorious that the majority of prescriptions given to candates to dispense at Bloomsbury Square are such as would never, or very rarely, occur in actual practice. If students were to devote more attention to what I may call the *theory* of dispensing there would be a great diminution in the number of failures on that particular subject. For the study of this 'theoretical dispensing,' I can recommend nothing superior to an examination and judicious tabulation of the various queries and replies that have appeared during the last four or five years in the *Pharmaceutical Journal* under the head of Dispensing Memoranda, I would recommend that especial attention be devoted to the able summary written by an accomplished pharmacist which appears in the Journal every month.

"It is to be regretted that proceedings in Parliament have rendered the passage or even the introduction of a revised Pharmacy Bill a matter of impossibility. But it is to be hoped future legislation will result in having the Pharmacy Act more fully extended and more strictly fulfilled, for if pharmacists are willing to obtain a suitable and costly education, and are required to possess exceptional and superior attainments for the benefit and advantage of the State and the public they are at least entitled to receive equivalents and sureties that their labour has not been in vain. It is abundantly obvious that medicines should only be handed to the public by persons who, from education are well acquainted with their properties, and that the mere restricting of the sale to qualified persons of a very limited number of poisons, which in most cases are rarely if ever demanded, is no suitable recompense for his labour and expense, and cannot be called just to the pharmacist. If the public interests require, which they certainly do, that he should undergo an expensive system of education, and obtain a high degree of qualification, legislation should not be for the public to the detriment of the pharmacist, and hence the necessity has arisen that the latter should enlist public sympathy and rouse public feeling against his province being invaded and trespassed upon by unprincipled traders and that, a technical examination being compulsory, adequate legal protection should be granted.

"The subject of the sale of poisons has been attracting considerable attention during the year, not only in the pharmaceutical world but amongst the public generally. A writer entirely outside our own circle has recently said:—'By the Pharmacy Act very stringent restrictions are placed on the sale of poisons. No one, unless he be a medical man, can obtain any of the more potent poisons without very considerable difficulty, such as giving name and address, stating purposes for which they are required, signing his name before witnesses, etc. The less virulent poisons are also put under restrictions, such as labelling distinctly the name of the substance, with the name of the seller and also the word "poison." The seller in both cases requiring to be on the Register of Chemists and Druggists. All patent medicine vendors are, however, exempt from these restrictions. It is open to any one, even the most ignorant, to put up and sell those powerful medicines (poisons they may be) in any quantity and of any strength, without control by Government or guarantee of any kind as to the ingredients. It will, we think, strike most minds that the proverbial coach-and-six may be driven under such circumstances with some facility through this Act of Parliament.' The warning thus given as to a certain class of patent medicines does not come too soon. They have been increasing to a very great extent in recent years, in fact supplanting very much the old well-known family medicines; and owing to the success of one or two comparatively innocent and even efficacious preparations, others of a baleful tendency have unfortunately become popular.

"Proprietary medicines are not only put up in this country, but as vendors we have actually to supply to the public what other countries choose to advertise. As an instance of this, I may mention an article now being freely advertised under the catching title "Rough on Rats." It cannot be supposed that vendors are to open and examine the innumerable proprietary articles that come from America. In this instance nothing but an examination by a qualified chemist would lead the public to suppose they were simply purchasing 'coloured arsenic.' How are we as vendors to know that we are liable to impeachment if we do not register the sale in the usual way?

"The desirability of including stamped proprietary medicines under the same liability as other drugs with reference to the poison regulations is now practically admitted by the medical and pharmaceutical professions and by the public generally, and let us hope will be easy of attainment. It will behove the Pharmaceutical Society to be watchful that the Government or some private legislator does not introduce a Bill having clauses inimical to the interests of pharmacy when dealing with this all-important question.

"The attention of pharmacists has recently been drawn to the refusal of the Privy Council to support the Pharmaceutical Society in its endeavour to place some restriction on the sale of several powerful chemicals which have been the cause of many an unfortunate and painful death. That refusal, I think, can be justified, however, by the explanation of their lordships that as Parliamentary legislation was impending, it would be advisable

to refrain from taking action just at present. The recent statement of a correspondent of the *Chemist and Druggist* that this refusal to sanction the resolution was a snub to the Council of the Society is sufficiently disposed of on this ground. And when due consideration is given to the fact that the resolution has excited the violent opposition of numerous interested and powerful trades, it will be immediately apparent that there was very little possibility of a body like the Privy Council, not possessing legislative functions, interferin in the matter.

"The Pharmaceutical Council have, in my opinion, scarcely acted wisely on the principle they have adopted, when drawing up the schedule of articles which they consider are entitled to rank as poisons within the meaning of the Pharmacy Act. It has evidently been considered that they would be serving the interests of the public best by including in the list only such virulent and destructive substances as are in common demand, omitting not only all that are not exceptionally poisonous but also many powerful bodies, which, although recognized by the Pharmacopœia, are not frequently made use of by would-be murderers and suicides. I may mention as an instance of this latter objection the case of calabar bean and its preparations, which are certainly as poisonous as most of the scheduled articles, and I cannot but think that if when first drawing up their list they had included all the corrosive acids, together with any pharmacopœial or other substances possessing poisonous or even moderately poisonous properties, they would not have found the Privy Council Committee of that date unwilling to ratify their action.

"But, as Professor Attfield has said, 'All drugs are more or less poisons,' and instead of scheduling a few powerful poisons it would be much wiser to draw up a list of such drugs as are quite innocuous, or that it would be an inconvenience to the public if the sale were restricted.

"Turning now more directly to what may be called the internal politics of our body, there is unfortunately little cause for congratulation, or even moderate satisfaction. Chemists have been proverbially disunited, jealous and suspicious of each other. To this very day they have never been able materially to shorten the hours of labour, which had they been more cosmopolitan and less selfish would almost as a matter of course have followed the foundation of the Pharmaceutical Society. As several eminent pharmacists have frequently said the great want of the day in our body is to awaken individual interest and arouse individual action. A stride, and a long one, in the right direction might be made if pharmacists by passing their examination became not only qualified in the eye of the law, but also necessarily members of a United Association. It has been long on the *tapis*, and has even been advocated by Dr. Greenhow, the representative of the Privy Council, that the term *Fellow* should be used instead of Member of the Society as heretofore. There is not much doubt that if this very desirable change were effected students would be far more inclined to press on for the higher qualification than they now are and the public would appreciate the difference between Fellow and Associate far more than they at present do between Member and Associate, which by many fairly informed persons are considered as synonymous terms. If by passing the Major examination this degree of Fellow of the Pharmaceutical Society were obtained, it would undoubtedly induce a larger number of candidates to come forward, and by that means the examination fee for the higher qualification might in course of time be done away with and a small annual subscription rendered compulsory in its stead.

"The recent meeting of the British Pharmaceutical Conference, at Southampton, was signalled and honoured by the presence in the presidential chair of one whose labours have been as unremitting as they were valuable in the cause of pharmaceutical progress, and there are few who, after reading the masterly address delivered by Professor Attfield, will not unhesitatingly assert that as an elaborate treatise upon the present position and future prospects of pharmacy in our country, it was emphatically a masterpiece; there can be little doubt that, whilst being the first, it was also the most important of all the literary contributions presented on that more than usually interesting occasion. Agreeing almost entirely with the Professor's ably advocated conclusions, it may not be altogether inappropriate that this evening I should make a few remarks suggested by special points occurring in the course of his address.

"One suggestion is the establishment throughout the country of drug farms on a larger scale than is the case at present. This is an excellent idea, but, as it would not directly affect the general body of pharmacists, perhaps is of minor moment. I think that if country druggists, instead of devoting their gardens entirely to flowers, fruit and vegetables, were to separate a space for the cultivation of small quantities of aconite, belladonna, henbane and other indigenous and easily grown medicinal plants, they would be able not merely to make many of their own preparations with a considerable saving in cost, but it would be of unusual advantage as an educational medium, not only to the pharmacist himself, but to his assistants and apprentices, who would only be too glad to spend a little time daily in cultivating the plants. With the exception of the more expensive and intricate processes, chemists should be encouraged to prepare their own medicines and be thus able to offer a personal guarantee of their strength and integrity. It would not only keep themselves in practice, but would also be a capital school for their *employés* and would undoubtedly be a powerful means of raising pharmacy in Great Britain to a level with that of other countries. They should also devote more attention to ascertaining the quality of important drugs than I fear they at present do. They should not allow such an article as opium or cinchona bark to pass their inspection without submitting it to a quantitative assay. The great disparity that exists in the amount of quinine present in the official yellow cinchona bark, for example, should place every pharmacist on his guard, as it is well known that those barks which are discarded by quinine manufacturers as being deficient in alkaloidal strength are the kinds frequently supplied to retail pharmacists for distribution to their customers; and until wholesale druggists adopt the practice of affixing a guaranteed table of assay to all packages of important drugs supplied, as is already done by a few of their number, the utmost care and supervision should be exerised.

"Reference to cinchona calls to mind the appearance in commerce of a new bark, differing from all known cinchonas in its aspect, density, texture and colour, etc., but which contains alkaloids characteristic of the true cinchonas (called cinchona cuprea). Mr. D. Howard announced to the Chemical Society in December last that, in conjunction with Mr. Hodgkin, he had extracted from the bark of cinchona cuprea an alkaloid closely resembling quinine in its general properties. It differs in the solubility of its salts and the readiness with which the alkaloid crystallizes from ether. This newly discovered alkaloid of the cinchonæ, or most probably of the *Remijiæ* (an allied genus), they named homo-quinine; it is found as yet only in this cuprea bark, and, except for a somewhat shorter crystal, exactly resembles quinine in appearance. It is also a remarkable fact that Mr. Whiffen, Dr. Paul, and Mr. Cownley, in this country, and Dr. Hesse, in Germany, isolated this alkaloid almost at the same time and quite independently of each other. From a commercial aspect this article has turned the bark market upside down.

"The suggestion that in sparsely populated districts which could not possibly support a qualified pharmacist, it should be allowable for agents to retail in unbroken packages, guaranteed and, of course, innocuous drugs, is a good one; but it should, I think, be stipulated that they might only be supplied to the agent by a duly

qualified man resident in the district, who would thus be almost personally responsible. In the case of the more powerful medicines this course should not be adopted, as I think it would be no hardship for a person to undertake a journey to the nearest qualified pharmacist when it would be necessary to procure them.

"In passing, I may just refer to a statement made by Professor Redwood at the Pharmaceutical Conference, with reference to an early re-issue of the British Pharmacopœia. From the tone of the Professor's speech, I should imagine that there can be little doubt that the boon—in fact, right—so long desired by pharmacists, will at length be conceded, and the Pharmaceutical Society will be invited to delegate some of the leaders of our profession as members of the Committee appointed by the General Medical Council for that purpose. I think that British pharmacists have reason to congratulate themselves on the progress they have made in this matter, and let us trust that this step upwards will never be retraced.

"The next Pharmaceutical Conference will be held at Southport, and I hope our members will give their encouragement and support, not only by their presence but with their contributions.

"The associated soirée will also be held, as is now usual, at St. George's Hall, and we must hope to maintain the prestige our own Association has hitherto held, by contributing exhibits of a suitable character, and helping in other ways that may be deemed desirable.

"The coming session promises well for success; papers have already been promised by Messrs. A. C. Abraham, T. F. Abraham, Conroy, Davies, Haddock, Mason, Sumner and Symes, and I hope everyone will endeavour to aid. All communications and inquiries stimulate interest, and we are here, as a body, to give you any information we can afford. If you have any doubt, try us."

The President then made some remarks upon the subject of the proposed compulsory notification of disease in Liverpool and concluded a lengthy address by expressing a hope that the officers might be cheered during the coming session by liberal offers of papers and interesting objects for exhibition.

Mr. Conroy moved a vote of thanks to the President for his most interesting address, and confirmed the President's remarks respecting "Rough on Rats," which he had found to be simply arsenic slightly coloured.

This motion was seconded by Mr. Shaw, who referred to the difficulty young men engaged in pharmacy experienced, owing to the fact that the first-rate houses did not receive apprentices.

The motion was supported by Mr. R. M. Sumner, who thought that apprentices would receive more personal instruction in the smaller houses than in the large ones, where the business was carried on by assistants. As "Rough on Rats" had been mentioned, he might say that he thought that the President had been "rough on wholesale druggists," who he believed were anxious to supply the best articles to anyone who would pay the necessary price.

Mr. A. H. Samuel referred to the prospect before a well-educated chemist, and thought that it was not to the credit of the English that so many of their manufactories should be presided over by German chemists.

Mr. A. H. Mason (Vice-President), in conveying the vote of thanks to the President, added additional testimony to the pleasure with which he had listened to the address. He was not disposed to criticize it, but desired to remind the members that in pressing for action to be taken with respect to those illegal traders who trespassed upon the dearly attained privileges of the pharmacist, it was absolutely necessary to educate the public to agitate for their defence. If the Pharmaceutical Society went to Government for protection they would be looked upon simply as a trade body, and legislation was always in favour of the public benefit and not to protect any class of traders. He hardly agreed with the President that drug farms would not affect the body of pharmacists, but was of opinion that if sufficient capital were obtained and a company formed for the protection and cultivation of indigenous medicinal plants, with appliances for the careful collection, drying, distillation, etc., it would eventually be a lucrative concern; besides, British pharmacy would be raised and the quality of English medicines in their efficacy would be maintained; they could be produced in such quantities as would enable them to meet foreign competition. If such an organization had existed at the present time, would English oil of lavender be at the present enormous price, besides running the risk of being an article of the past? He quite agreed that it was desirable that pharmacists should make their own pharmaceutical preparations, but there were many instances in which the quantities required were so small that it was not profitable for them to do so, and although they purchased these articles it did not follow that they were incompetent to manufacture them. It seemed to be overlooked by those who were rather inclined to condemn the wholesale manufacture of these articles, that most of the wholesale manufacturers were themselves pharmaceutical chemists and many of them prize medalists, and that they also gave employment to hundreds of pharmaceutical chemists, and further the mild insinuation of deception on the part of wholesale manufacturers was unjust, for it must not be overlooked that in maintaining their reputation they had by far a larger pecuniary interest at stake than any retailer. The President rather advocated the purchase of assayed drugs. To his mind, those who quoted such articles in their price lists rather cast a reflection upon the purchasers, and in carrying out this principle it was not likely the purchaser would further assay for himself, therefore the object of Professor Attfield's suggestions would be destroyed. Respecting the notification of infectious diseases, he was of opinion that it was not fair to throw the whole onus of notification upon the medical man.

The President, in reply, said he had occupied so much time that evening in reading his address that he would not on that occasion enter into further discussion. It was sufficient recompense to him that it had evoked so much favourable approval, and such only fair criticism. The opinions expressed were individual and it was only by the clashings of opinion that right judgment was arrived at. At some future time some of the subjects mentioned might fairly occupy the attention of the Association.

ABERDEEN CHEMISTS' ASSISTANTS' MUTUAL IMPROVEMENT ASSOCIATION.

On Friday, October 20, a meeting of Aberdeen chemists' assistants and apprentices was held in the Café Buildings, Shiprow, for the purpose of forming a Mutual Improvement Association. Mr. Kidd occupied the chair, and there was a large attendance. A very satisfactory report was submitted by a committee that had been appointed to arrange as to preliminaries. This report was approved of, and the formation of a Mutual Improvement Association followed, after which a considerable number of members were enrolled.

The following were elected a Committee of Management:—Messrs. Peter Smith, Angus, Kidd, Wilson, Anderson, Mackenzie, Davidson, Watson, and Moir. Mr. G. Bowie was elected secretary, and Mr. Mathieson, treasurer. A number of the employers have consented to become honorary members.

The members will meet weekly for the discussion of matters relating to their business, and several gentlemen from the south are expected to give lectures at intervals during the winter.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, October 18, 1882, at 4 p.m. Present—Professor Attfield, F.R.S., President, in the chair; Messrs. Bentley, Brady, Carteighe, Ekin, Groves, Naylor, Southall, Squire, Taylor, Dr. Thresh, and Messrs. Benger and Plowman (Hon. Secs.).

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Messrs. Kinninmont and Young.

The question of the cost of entertainment of visitors incurred by the towns in which the meetings of the Conference are held was considered. It was deemed advisable that the practice of the British Association should be followed as nearly as possible. It was therefore resolved:—

"That it be a general instruction to the local committees of towns in which the Annual Conference is to be held, that their arrangements, both in respect to the business of the Conference and the entertainment of its members be approved by the Executive before publication, and that the attention of local committees should be called to the report of the Executive after the Sheffield meeting, in so far as it relates to questions of entertainment."

Respecting the place of meeting for 1883, the President reported that he had received a letter from Oxford, which he had been directed by a previous Committee to acknowledge. It was from Mr. Geo. T. Prior, who wrote to the effect that in the case of Oxford being selected as the town in which the British Pharmaceutical Conference would meet in 1883, the chemists of that city had deputed him to say that they would be glad to receive the Conference, and would do their best to help the Executive Committee in organizing the meeting. They were too few in number to offer the hospitality that the members had received in other towns, but they would engage a meeting room, arrange for hotel accommodation, and would endeavour to promote the objects and welfare of the Conference and the comfort and convenience of visiting members.

The following is the President's reply:—

"To Mr. G. T. Prior, Oxford.

"My dear Sir,—I am directed by the Executive Committee of the British Pharmaceutical Conference, to thank the chemists of Oxford for their kind offer to give their best assistance in organizing any meeting of the Conference that may be held in Oxford, in 1883. I am also desired to acknowledge the kindness of Mr. Thomas Houghton in allowing himself to be put in nomination as a Vice-President of the Conference, Mr. Charles Gerrard Hitchcock for consenting to be a member of the Executive Committee, yourself for agreeing to act as a Local Secretary, and Mr. H. Thurland for being willing to perform the duties of an Auditor. I am further to add that the Executive Committee was quite gratified to find that the pharmacists of Oxford purposed receiving the members of the Conference in a manner strictly in accord with the objects of the Conference, and with the already published wishes of the Committee. I, in common with the other members of the Committee regret that the unforeseen circumstances which render Oxford unable to carry out the arranged meeting of the British Association in 1883 have obliged the Conference to postpone any decision respecting our own place of meeting for that year, for as a rule the Conference and the Association meet in the same town. For the same reason also we must postpone the acceptance of the services of yourself and colleagues. I shall doubtless again have the pleasure of corresponding with you after the Executive Committee has held a meeting.

"Yours faithfully, JOHN ATTFIELD."

A letter from the chemists of Southport was read, inviting the Conference to meet in their town in 1883. It was unanimously agreed to accept this invitation.

Respecting the invitation to meet in Aberdeen, as it was offered for 1884 as well as 1883, its consideration was postponed.

The following four officers, which the General Meeting had given power to this Committee to appoint, were then elected:—Vice-President, Mr. W. V. Radley, Southport; Member of Executive Committee, Mr. James Kershaw; Local Secretary, Mr. William Ashton; Auditor, Mr. Thomas H. Sykes.

Fifteen gentlemen were elected to membership.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held on Wednesday evening last, October 25, at 32A, George Street, Mr. W. A. Wrenn in the chair, a paper on "Cinchona Barks of Commerce" was read by Mr. W. Elborne, who gave a very interesting account of the various kinds of barks of commerce.

There was a good discussion, in which Messrs. R. W. Giles, R. H. Parker, W. A. Wrenn, J. O. Braithwaite, and others took part; after which a hearty vote of thanks was proposed by Mr. Hartridge and seconded by Mr. Parker, to which Mr. Elborne made a suitable reply.

Parliamentary and Law Proceedings.

A CORONER ON THE SALE OF LAUDANUM.

On Friday, October 20, an inquest was held in the Royal Hospital, Belfast, by the borough coroner, Dr. Dill, concerning the death of Thomas Thompson, a publican, who had been admitted to the hospital on the previous Tuesday, suffering from the effects of an overdose of laudanum, and who died on Friday morniug.

After other evidence had been given, John Patrick Henry, chemist, 97, Donegall Street, Belfast, stated that on Tuesday, about three o'clock, a man whom he believed to be the deceased came into his business establishment, and asked for sixpennyworth of laudanum. Witness inquired what it was for, and he said for a horse that was ailing. The deceased then got a bottle with an 1½ ounce of laudanum, and witness labelled it "Laudanum—poison," with his name and address. Witness thought from the appearance of the deceased that he had something to do with the management of horses. The deceased had not the slightest appearance of having taken drink. Witness did not consider it necessary to inquire the name and address.

A Juror thought that when such a dangerous thing as laudanum was asked for there should be more inquiries made than had been done by the witness.

Witness: I did more in the matter than the law directs, for I not only labelled the article, but inquired the purpose for which it was intended.

The Coroner: But the law provides that you should take the name and address of the purchaser.

Witness: Excuse me; it does not in the case of laudanum.

The Coroner: I know that, but it is a great mistake not to do it.

Witness: But the taking of his name and addr would not have prevented this man from committing act that he did. There are plenty of druggists in Belfa and he had only to got a pennyworth of a number them and he would have had as much as he wanted.

The Coroner: I am sure that intending suicides abroad in the neighbourhood of Belfast will be thankful to you for the information you have given.

The Coroner said when Mr. Henry went the length of asking the man's name he might have gone further, as

the asking for such a quantity of laudanum looked very suspicious.

Mr. Henry: I thought I did all that was necessary; I had no idea that the laudanum was intended for any other purpose than that told to me.

The Coroner: Would you do the same thing again?

Witness: I would rather not sell laudanum at all.

The Coroner: I wish you never had sold it. If you had not done so you would not have got into trouble.

Witness: The man was as sober-looking as any of the jury are at this minute.

The Coroner: The only point in the matter is the selling of such a quantity to a stranger without making yourself thoroughly acquainted with the purpose for which it was intended. My impression is that the law should be a little more stringent than it is with regard to a drug like laudanum. I have heard of people going into surgeries and not being given more than a pennyworth, and that not full strength.

Witness: If I mixed it I could be prosecuted.

The Coroner: As you say yourself, you would rather not sell laudanum, and I wish you did give it up, for there are too many in Belfast dealing in this poison.

In reply to a juror, the wife of the deceased stated that her husband was in the habit of taking laudanum in pennyworths to produce sleep, as when he was drinking he never got any rest at night.

Robert Campbell, druggist, 15, Bridge Street, stated that a person named Thompson received an ounce and three-quarters of laudanum in his shop between three and half-past three o'clock on Tuesday. Witness took his name and address, which he gave correctly. He said he wanted the laudanum for a horse. There was nothing in his appearance that could lead one to believe that he was under the influence of drink.

The Coroner: What made you ask him for his name and address?

Witness: I always make it a point to take the names and addresses of persons receiving half an ounce of laudanum or anything beyond that.

The Coroner; Did you ever sell anything like this for a horse before?

Witness: Yes; I have often, and have known a horse to get 2 ounces.

In reply to a juror, Mrs. Thompson stated that she never heard her husband threatening to commit suicide. He was a little annoyed about the sale of a house that he had lost some money over, and was occasionally depressed in spirits.

Head-Constable Furey said that when the deceased was brought to the police office and searched, four bottles which had contained laudanum were found in his pocket. As soon as this was discovered witness feared that he had poisoned himself, and had him removed at once to the Royal Hospital. Two of the bottles were labelled Haslett and Co., North Street. Witness inquired there about the matter, but they were unable to say whether any laudanum had been sold to the deceased.

Dr. James Barron, House Surgeon, deposed that death resulted from congestion of the lungs. The deceased was insensible when admitted, but after the effects of the morphia had disappeared he regained his senses, which he preserved up to within a short time before his death. He told witness that he had only taken a pennyworth of laudanum to cause him to sleep. Witness believed that at the time when the deceased took the narcotic poison the deceased was not aware of what he was doing.

The Coroner said he was not at all satisfied that the deceased took the laudanum with any suicidal intention. He was in an unfit state to take care of himself, and appeared to have fallen back on the old idea of the pennyworth of laudanum to produce sleep. To his (the Coroner's) mind, the man did not know what he was doing.

Dr. Barron said that was his impression also.

The Coroner having summed up the evidence, the Jury returned a verdict to the effect that death resulted from congestion of the lungs, accelerated by heavy drinking and the excessive use of laudanum.—*Belfast Evening News.*

Poisoning by Vermin Killer.

An inquest has been held by the Middlesbrough Coroner, Mr. Belk, touching the death of Mr. A. Woodford, late cashier to the firm of Swan Brothers, Middlesbrough.

Mr. H. H. Taylor proved selling deceased sixpennyworth of "Battle's Vermin Killer," which deceased said he wanted "to destroy some nocturnal friends." He had purchased what contained 6 to 8 grains of strychnia, or enough to kill a dozen men.

Dr. Walker testified to being sent for on Wednesday night, when deceased owned to having taken vermin killer, and though every effort was made to save his life, he died in a quarter of an hour after he was called.

The Coroner having summed up, the Jury returned a verdict "that deceased had taken 'Battle's Vermin Killer,' containing strychnia, while in an unsound state of mind."—*Leeds Mercury.*

Review.

Adolph Strecker's Short Text-Book of Organic Chemistry. By Dr. Johannes Wislicenus, Professor of Chemistry in the University of Würzburg. Translated and Edited, with Extensive Additions, by W. R. Hodgkinson, Ph.D., and A. J. Greenaway, F.C.S. London: Kegan Paul, French and Co. 1881.

At the beginning of this century, chemists could almost count upon their fingers the organic substances with the properties of which they were acquainted, and even within recent years it was not so difficult to include, within one moderate volume, a full account of all that was known about organic chemistry. Now it is different, and the author of a text-book has to undertake the arduous task of picking and sifting what he thinks will be useful to his readers from what he thinks they do not want. He cannot expect to satisfy all, but must be content to cater to the wants of a particular class of readers. In this way text-books of organic chemistry come to be separable into distinct species. There is the *elementary* book, the object of which is to explain the leading principles of the science, the general group characteristics, and so forth, the properties of individual substances being only so far discussed as they exemplify general laws. Of this class one of the best representatives is Armstrong's volume in the science series published by Longman. Then there is the *cram* book, which gives the student, in concise form, all the facts he need burden his memory with prior to examination; an example of which is Piner's Repetitorium. A third species may be called the *dictionary* text-book, whose chief requisites are that it shall be well up to date, omit nothing, and give full references to original papers, and which is the invaluable companion of the more advanced chemist. We do not here include the various forms of pharmaceutical text-books, nor those known as technical text-books, for they in reality can hardly be classed under the head of organic chemistry as understood by scientific chemists. Now the book before us does not belong to the elementary, the cram-book or the dictionary species, but must be placed in a separate group. Professor Wislicenus himself says, "it is neither a primer nor a dictionary," and he certainly would not allow that it was written purely for examination purposes. So the question arises, what is the class of men for whom such a book is written? and we cannot but come to the conclusion that there is really no class likely

to profit greatly by its publication. No teacher would prescribe such a book to a student new to organic chemistry, or, if he did, the student would fail to understand it; while anyone sufficiently far advanced to use the book would certainly find it insufficient for his purpose. We think that the same criticism is applicable to other and similar text-books, which are too full to be read by the student, yet not full enough to be consulted by the chemist. As an example of how useless it may be for consultation, let us imagine a chemist looking up this book for a method of making dichloracetic acid. He turns to p. 455, and finds that it is "prepared by the action of equal molecules of chloral hydrate and potassic cyanide." The extraordinary construction which assumes that molecules of these two bodies can, under any circumstances whatever, be equal, is probably due to careless translation, *molecule for molecule* being, of course, what is meant. But what we chiefly object to here is that the above sentence is merely a verbal interpretation of the equation which follows it. No one could learn from it how to make dichloracetic acid, nor is there any reference to original papers which might enlighten him. Similarly on p. 366 we read that "ethylic acetate" (acetic ether) "is *best prepared* by distilling 10 parts of sodic acetate with a mixture of 15 parts of sulphuric acid and 6 parts of alcohol," no reference being made to the advantage derived from first dehydrating and fusing the sodic acetate. While dealing with practical details, we notice that under the head of chloroform, its ready decomposition in some circumstances is attributed, at least in part, to the *presence* of alcohol. One characteristic of the book is its large dealing with graphic formulæ. These are, no doubt, of great assistance, being, in fact, at present, the organic chemist's special language. But, as has been so often pointed out, there is considerable danger attending the use of them by the student, who is apt to forget that they are, after all, but an imperfect representation on paper of some of the properties of substances; to forget, for instance, that alcohol is a liquid boiling at 79° C., and to think of it as a combination of letters and strokes. In one or two cases this book errs in this direction, as when (p. 36) it says "of the many instances of isomerism of the second kind . . . there may be mentioned

$$CH_3-CH_2-CH_2-CH_2-OH \text{ and}$$

$$\begin{matrix} CH_3 \\ CH_3 \end{matrix}\!\!>CH-CH_2-OH"$$

No names are given—nothing more is said. Surely one may fairly say that this is not mentioning instances but drawing diagrams. This kind of error, however, is far less common throughout the book than the author's extensive use of graphic formulæ might lead one to expect. Indeed one of the best chapters in it, and one which will be found really useful, is that which treats of isomerism among the aromatic compounds, for here the student will find well described the practical distinctions between ortho, meta and para compounds, as well as the causes which theory assigns to these differences. It is not uncommon to find a student well up in the latter, but totally ignorant of the former. Some parts of the introduction, also, are worth reading; but it is by no means free from errors. Thus it is asserted (p. 41) that the atomic volume of oxygen, when combined as in alcohol, is 6·4. This might have been put down as a misprint for 7·8, but, unfortunately, two of the calculations on the next page are based upon the assumption of this erroneous value. So also the atomic volume of nitrogen when combined as in cyanogen is given as 28·0, whereas it is only 17, that of cyanogen itself being 28·0. The three pages dealing with this subject of specific volumes might, with advantage, be entirely rewritten.

We have mentioned some of the bad points of this book. That it has many good ones, the names on the title page are a sufficient guarantee; but we fear it will be found, as we say, too difficult for the student, too meagre for the chemist. If, indeed, there does exist an intermediate class of readers, we may recommend it to them as neither much better nor much worse than others of its kind. The translation is good, except in a few cases where German idiom has been allowed to creep in and spoil the English.

Correspondence.

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

Percentage of Morphia in Liquid Extract of Opium, and Commercial Silver Nitrate.

Sir,—Not being present at the British Pharmaceutical Conference when my papers were read, will you allow me to state the method by which I calculated the percentage of morphia in liquid extract of opium, data of which were required by Mr. Plowman.

On reference to the figures obtained I find that ·58 was the percentage of morphia that should have been stated and not ·38 as appeared in the paper. About 21·5 grs. of solid extract are contained in each fluid ounce of the liquid form, the average specific gravity of which I found to be ·972, and the average yield of opium (of 8 per cent. of morphia quality) in extract to be 66 per cent. Therefore in 66 grains of this solid extract there would be 8 grs. of morphia. One fluid ounce of the liquid extract, specific gravity ·972 will weigh 450 grs. and in this 450 grs. are dissolved 21·5 grs. of solid extract (66 grs. of which contain 8 of morphia), and if 66 grs.contain 8 then 21·5 grs. will contain 2·6, so that if 450 grs. of the liquid extract contain 2·6 of morphia the percentage will be ·58; on looking at the residues of the ten samples which I examined I find deposits in eight of them; whether these deposits contain morphia or not I have not yet determined.

I had hoped to have been present at the Conference to to ask if any maker of liquid extract of opium could explain why the percentage of morphia was so much under the average in this preparation, but could not reach Southampton from the Shetland Islands in time.

In answer to Mr. Mason respecting the source of the samples of nitrate of silver, the two found pure were obtained from Messrs. Herring and Co., and Messrs. Rouse and Co., Wigmore Street respectively; one I received for analysis from a former pupil of mine, and three I purchased from itinerant photographers. Seeing Mr. Williams's remarks relative to his experience of these crystals I have forwarded to him through the courtesy of the editor of the *British Journal of Photography*, two samples containing as an impurity nitrate of potassium, which were also purchased from itinerant photographers.

Grosvenor Villa, Devonport Road, Uxbridge Road, W. JOHN WOODLAND.

Junior.—In one case the word is placed in the accusative as the direct object of the verb; in the other it is in the genitive, some such phrase as "a sufficiency of" being understood.

"*Succus.*"—The percentage of citric acid in raw lime juice is variable. As to the average strength, see two papers by Mr. Warington, in the present series of this Journal, vol. vi., pp. 385 and 768.

"*Pertinctus.*"—"38° B." would stand for the density represented by 38 degrees of Beaumé's hydrometer. The equivalent specific gravities may be found in Squire's 'Companion' and many other works; that of 38° B. is specific gravity 1·333.

"*Dispenser.*—The ointment should be quite a creamy white when made, but changes to a yellow colour when kept.

Junior.—The formula is not suitable for pills. The aniline liquifies the camphor and the result is a soft paste.

Student.—Nitric acid, "azote" being used to designate nitrogen.

W. R. F.—(1) Pharmaceutical chemists have no special exemption from special constable service. (2) Such a practice would involve an illegality.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tichborne, Keyworth, Gravill, Surfleet, Jones, C. J. S. T.

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(To present date).

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Morphiæ Sulphas ....1-8 grain.	Atropiæ Sulphas ....1-250 grain.
Morphiæ Sulphas ....1-12 grain.	Atropiæ Sulphas ....1-60 grain.
Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
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BURROUGHS, WELLCOME & CO., Manufacturing Chemists, 7, Snow Hill, London, E.C.

London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 645.] SATURDAY, NOVEMBER 4, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 6th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and

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Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

WANTED. — The PHARMACEUTICAL JOURNAL for January 11th, 1873, and January 6th, 1877. Full price will be given by the Secretary, 17, Bloomsbury Square, W.C.

NORTH BRITISH BRANCH,

119A, GEORGE STREET, EDINBURGH.

EVENING MEETING.

The first Meeting of the Session will be held on Wednesday, November 8th, at 8.30 p.m.

Mr. ALEXANDER NAPIER, President of the Branch, in the chair.

Order of proceedings :—

I. Presidential Address.
II. "Note on Solubility of Morphia Salts." By D. B. DOTT, F.R.S.E.
III. Donations to the Library and Museum.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

LECTURES.

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On Monday, Tuesday, and Wednesday Mornings, from 9 till half-past 10 o'clock.

FEES.	£	s.	d.
One Course (five months)	3	3	0
An entire Session (two Courses)	4	4	0
Perpetual admission	5	5	0

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Botany and Materia Medica, one Course (five months)	2	2	0
An entire Session (two Courses) including Systematic and Practical Botany	3	3	0
Systematic and Practical Botany, separately	1	1	0
Perpetual admission to all the Courses	4	4	0

The First Course, extending from October to the end of February, comprises Botany and Materia Medica, with especial reference to Structural Botany and the use of the Microscope. The Second Course, which commences in March and extends to the end of July, comprises Botany and Materia Medica, with especial reference to Systematic and Practical Botany.

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Hours of Study.	One Month			Two Months			Three Months			Five Months			Ten Months		
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10.0 to 5.0 daily (Sat. 10.0 to 2.0)	4	4	0	7	7	0	10	10	0	15	15	0	26	5	0
Three days weekly or 3 hours daily	2	17	6	4	17	6	6	16	6	10	10	0	17	17	0
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The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock.

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THE CHEMISTS' BALL.

BY permission of the Council of the Pharmaceutical Society, a Meeting will be held at 17, Bloomsbury Square, on Monday evening, November 6th 1882, at 9 p.m., for the purpose of making Preliminary Arrangements for the ensuing ball. Any gentleman desirous of becoming a Steward, and unable to be present, will oblige by informing the Honorary Secretary without delay if such is his intention.

143, New Bond Street, W. JOHN F. SAVORY, *Honorary Secretary.*

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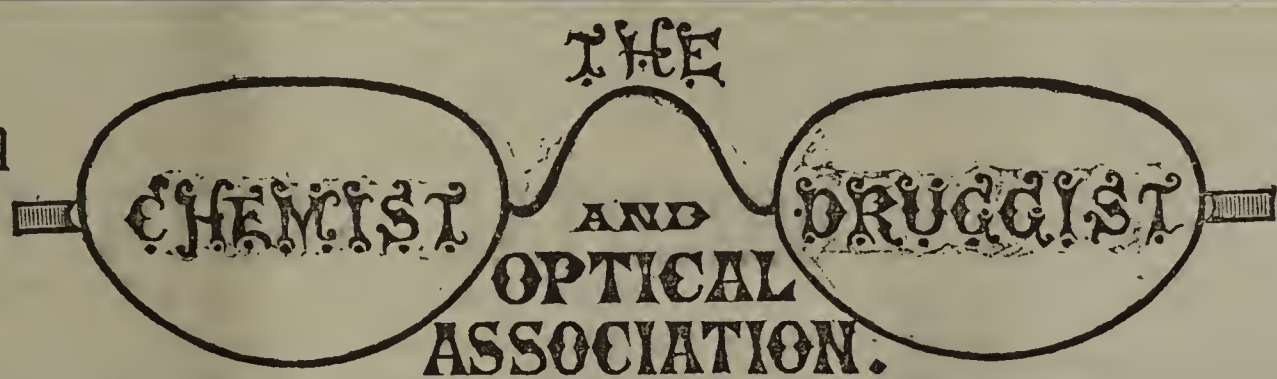

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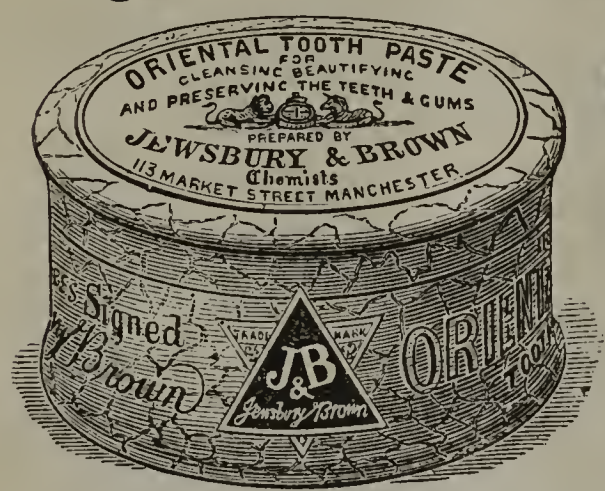

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On and after November the 1st the present 4/6 size will be reduced in price to **2/9,** and larger sizes will be put up at 4/6 and 11/-. None of the new sizes will be issued until November 1st. During November all stocks of the old sizes on hand can be returned **through the house from which they were bought,** and will be credited or exchanged for an equivalent value in the new sizes.

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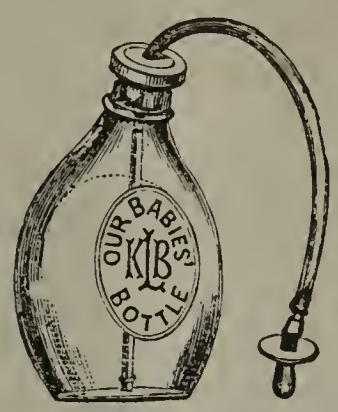

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16 ounce	8 inches	16/6	18/6	20/	22/	per dozen.
20 ,,	9 ,,	17/6	20/	21/	23/	,,
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42 ,,	11 ,,	22/	25/6	26/6	30/	,,

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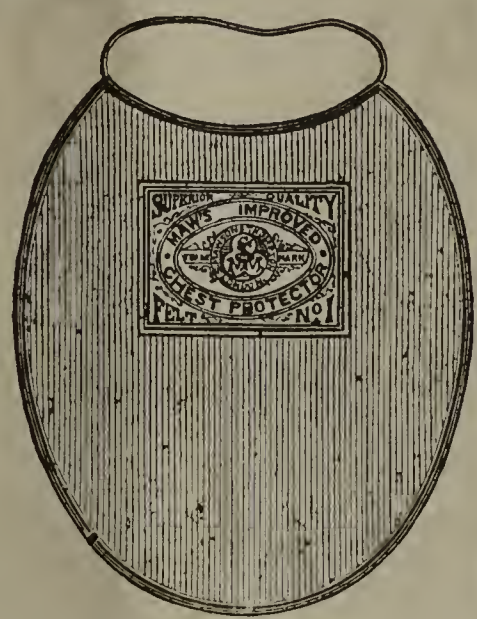

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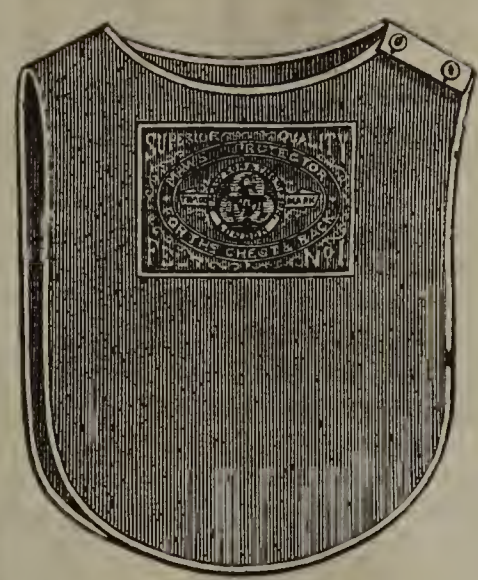

No.	Best.	Second.
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2.	22/6	18/6
3.	28/0	23/0
4.	34/0	28/0
5.	45/0	36/0

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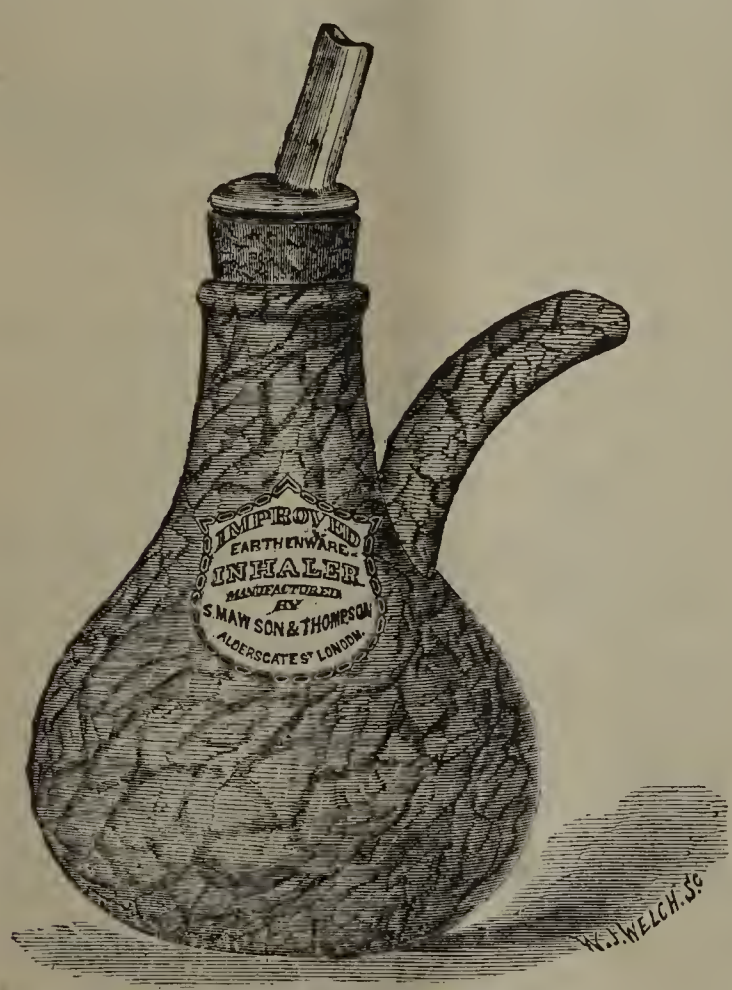

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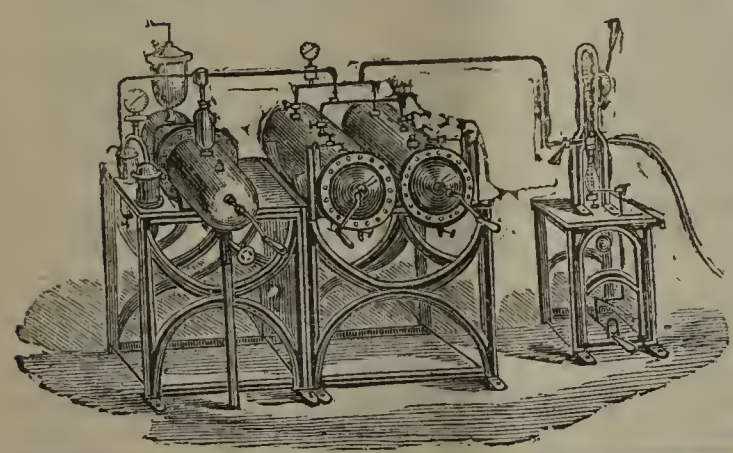

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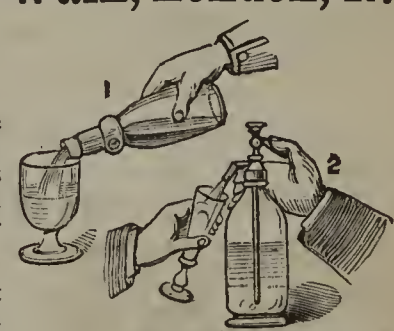

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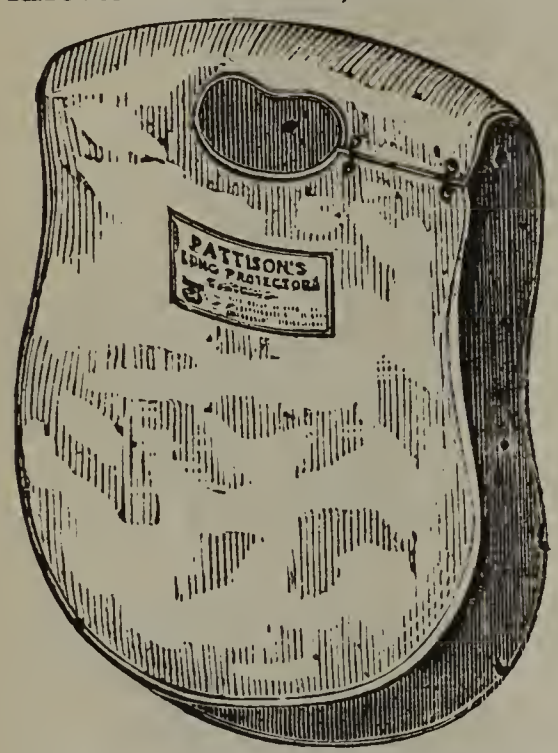

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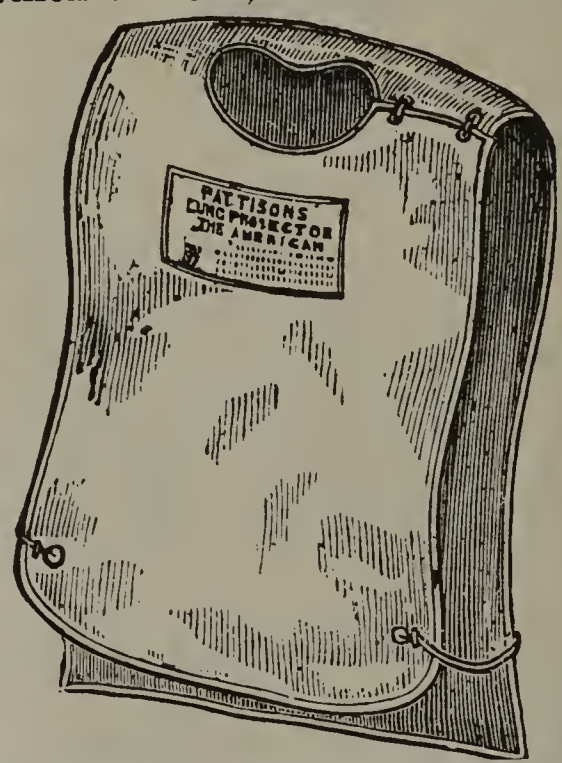

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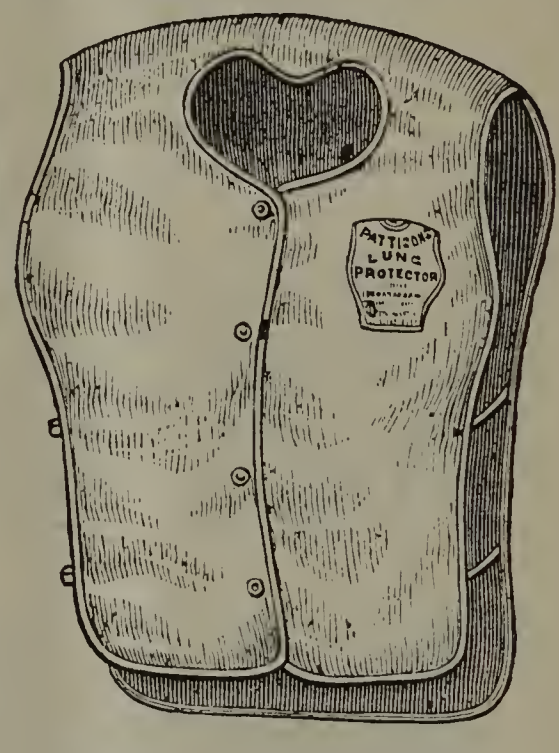

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THE ORCHARD ALUM SPRING.*

BY DR. THRESH.

The examination of all substances used in curing or alleviating disease, whether they be of mineral or vegetable origin, falls within the province of the pharmacist, and where the remedy consists of a number of proximate constituents it is his duty to isolate these, and if possible to ascertain to which of them its efficacy is due. As the water of the spring giving the title to this paper has long had a local reputation, I have made a somewhat careful examination of it, and as it is being constantly employed as a curative agent, it has been deemed a suitable subject for a contribution to this Society.

The spring, which appears to be a "descending" one, originates in a disused coal mine, near the summit of Axe Edge, the highest point in the Peak country. To get rid of this water a narrow tunnel has been bored through the side of the hill, just over the Staffordshire border, and about five miles from Buxton, and the water flows from the open end of this conduit into a tributary of the Dane. As the farm on the hillside is known as the Orchard (a most singular name for such a bleak and desolate spot), and the water has a strongly astringent taste, the spring is usually called the Orchard Alum Spring.

The country people round have great faith in the virtues of the water, and not only make use of it themselves but frequently bottle it to send long distances to their friends or others who arrange with them so to do. It is chiefly valued as a vermifuge, and no matter what may be the description of the parasite, nor whether it infest young or old, human beings or cattle, one or more doses of this remedy is said to bring about the desired result. It is for this purpose usually taken fasting. Cattle, after being kept without food and water for some time, are allowed to drink as much of the fluid as they will, and the effect produced is frequently described as astonishing. As a tonic its reputation is waning, continued use of it even in small quantities producing obstinate constipation, and generally doing much more harm than good. I am informed that years ago many members of the medical profession in the neighbouring towns and villages prescribed it frequently, but I do not think such is the case at the present time.

Applied externally it is said to cure ringworm, and it is largely used by the farmers as an outward application for various skin diseases on cattle.

The water has a very decided red tint, varying in depth according to the character of the season. The sample analysed was collected after a period of continuous rain, and was not near so dark as it is usually seen, yet when placed in a wine glass it looked like a pale sherry. Seen in larger volumes, in the deeper portions of the stream, it has the colour of blood. It reddens litmus paper, but contains no free acid. When heated to about 150° F., it becomes quite opaque from the separation of a basic ferric sulphate, but if allowed to evaporate on the water-bath nearly to dryness, the basic salt redissolves and a yellow vitreous residue remains. When heated so as to cause the above salt to deposit, the supernatant fluid is quite colourless.

The mean of two concordant determinations of the specific gravity gave 1·00351 as compared with pure water at the same temperature, and each gallon was found to contain—

$Fe_2 3SO_4$	174·426	grains.
Fe_2O_3,	6·275	,,
$Al_2 3SO_4$	72·908	,,
$MgSO_4$	21·055	,,
$CaSO_4$	14·381	,,
$FeSO_4$	1·596	,,
Na_2SO_4	·537	,,
K_2SO_4	·822	,,
$AlPO_4$	·456	,,
KCl	·282	,,
NH_4Cl	·125	,,
KNO_3	·170	,,
SiO_2	5·776	,,
	298·809	,,

The results from which these quantities are calculated are tabulated at the end of the paper, and with regard thereto it may be remarked that in the first estimation of the phosphoric acid, the dried and weighed mixture of ferric and aluminic oxides and phosphates was fused with six times its weight of a mixture of 4 parts of sodium carbonate and 1 of silicic acid. The mass was exhausted with water containing a little ammonia carbonate, traces of silica removed by evaporation with acid, and the phosphoric acid precipitated with magnesia mixture. In the second determination the mixed oxides, etc., were dissolved in nitric acid, and the phosphoric acid removed by aid of ammonium molybdate.

Reference to the composition of the water, as given above, shows that the medicinal properties of the spring are due to the ferric and aluminic sulphates of which it contains so large a quantity. Undoubtedly it is of too powerful a character for internal use unless very considerably diluted, but even then as a tonic its value is impaired by the presence of the sulphate of aluminium. Its acid reaction, of course, is due to the presence of these salts, and the excess of ferric oxide explains the decomposition which takes place when the water is heated. It is somewhat singular, however, that when carefully evaporated, the basic salt first deposited redissolves, yielding a residue which can be diluted, forming a very nearly colourless solution. The acidulous and basylous radicals in this latter case can scarcely be in the same state of combination as in the original water.

We have not far to look for the source of the more abundant constituents. The spring rises or rather issues from the hillside immediately above the upper surface of the millstone grit formation, which is here exposed and forms the bed of the rivulet into which the water flows. Overlying the sandstone is a layer of aluminous shale of a blue-grey colour, and doubtless by the action of the air and water this suffers such decomposition as to produce the soluble salts found in the spring. The exposed edges of this shale are encrusted with ferric oxide, and here and there after rain the water dripping off is seen to be distinctly coloured. Usually water passing through such a stratum contains a considerable amount of ferrous sulphate, together with aluminic sulphate and a smaller or larger proportion of ferric salts, the formation of the first named being represented by the equation—

$$2FeS_2 + 7O_2 + 2H_2O = 2FeSO_4 + 2H_2SO_4.$$

The sulphuric acid then reacting upon the clay will form the aluminic sulphate. On the opposite side of the hill, the water flowing from a similar

* Read at an Evening Meeting of the Pharmaceutical Society, November 1, 1882.

mine contains ferrous salt equivalent to 50 grains of crystallized ferrous sulphate to the gallon, with only a trace of ferric salt, and doubtless this is derived, by some such decomposition as the above equation represents, from the pyrites in the surrounding strata. To account for the formation of the ferric salt the oxidation must be carried further, the reaction being represented as follows:—

$$4FeS_2 + 15O_2 + 2H_2O = 2Fe_2\ 3SO_4 + 2H_2SO_4.$$

Further, by action of the ferric sulphate on the magnesium and calcium carbonates, with which doubtless the water comes in contact in some part of its course, the sulphates of magnesium and calcium would be formed together with ferric oxide and the basic ferric salt. An illustration of this decomposition is furnished by the stream into which the alum water flows. A few yards beyond the point where the iron water enters it, it receives another little tributary. The water in the latter appears to be rich in calcium carbonate, for where it falls into the larger stream the whole of the mixed water becomes perfectly muddy and for a considerable distance below the bed of the stream is thickly coated with an ochry deposit.

The only water of a similar character of which I can find an analysis occurs in a mine belonging to the Luzerne Company (*Dingl. polyt. J.*, ccxviii., 267), but this only contains 122 grains of solids per gallon, whilst as much as 23 grains of free sulphuric acid occur therein.

By way of conclusion it may be remarked that a water of this kind proves in a marked degree the futility of attempting to check the analytical results by comparison with the amount of solid residue left upon evaporation of a given quantity, whatever may be the temperature at which the residue is finally dried. The whole of the water could only be driven off in this case by heating to such a degree that the ferric sulphate began to decompose, and the residue then was so hygroscopic that an accurate weighing was impossible.

Table of amounts of products obtained during the analyses calculated as from 10,000 parts of water.*

	Portion of residue soluble in water.	Portion insoluble in water.	Total.	Total Estimation.	Mean.
SiO_2		·825			·825
$BaSO_4$	67·188	2·334	69·522	69·406	69·464
AgCl	·080			·076	·078
HNO_3				·015	·015
CaO	·449	·391	·840	·853	·846
$Mg_2P_2O_7$ (for magnesia estimation	2·742			2·822	2·782
NaCl				·063	·063
KCl				·159	·159
NH_3				·006	·006
Mn_3O_4	Minute trace.				
FeO				·108	·108
$Mg_2P_2O_7$ (phosphates) . . .	·093			·088	·090
$Al_2O_3 + PO_4 + Fe_2O_3$.	12·428	·398	12·826	12·968	12·897
Fe_2O_3				9·580	9·607
Al_2O_3				3·204	3·213
Albuminoid NH_3 .				·001	·001

[*The discussion on this paper is printed at p.* 376.]

* *Vide Journ. Chem. Soc.*, April, 1882.

NOTE UPON THE USE OF OXALIC ACID AS A TEST FOR ARSENIATES IN ALKALINE SALTS.*

BY C. PATROUILLARD, GISORS.

In an interesting memoir presented recently at the meeting of the British Pharmaceutical Conference, and published in the *Pharmaceutical Journal* of the 16th of September last, Messrs. Naylor and Braithwaite give an account of several experiments made by them with considerable care, and affirm that they have recognized afresh that oxalic acid does not exercise any reducing action upon arsenic acid, and, after having quoted a few lines from the memoir in which I published the result of my researches, they express the opinion that, under the conditions described by me, nothing of that which I have announced takes place.

Nevertheless, I maintain that which I wrote in 1874, and which I have repeated many times since in the testing of salts employed in my pharmacy; it may be summarized as follows:—When a *salt* contains at least 1 to 2 per cent. of an *arseniate*, if it be boiled with oxalic acid or oxalate of ammonia for a few minutes, sulphydrate of ammonia or sulphuretted hydrogen, after the addition of a few drops of pure sulphuric acid, will produce in it, at the end of an interval more or less long, a yellow precipitate of trisulphide of arsenic. This precipitate may be accompanied by a varying quantity of sulphur. If the proportion of arseniate contained in the salt amount to 5 or 10 per cent., and especially if the mixture be still sufficiently hot, the precipitate is produced *immediately*.

In my previous experiments I have always employed salts such as nitrate of potash, the sulphates of soda and magnesia, the bicarbonates of potash and soda, etc., to which had been added either biarseniate of potash or arseniate of soda. I have noted in my laboratory register a large number of testings, as varied as possible, and checked in such a manner as not to allow of error. The precipitating agent has been sometimes sulphydric acid, and more frequently sulphydrate of ammonia, which is more easily kept ready in a good state of preservation, provided that it be dissolved in glycerine. In any case, in order not to be led into error by a precipitate of sulphur, which might mask a small quantity of trisulphide of arsenic, it is always advisable to make at the same time a comparative test with a specimen of a salt which is known to be pure.

The following are some new experiments that I have made since reading the memoir of Messrs. Naylor and Braithwaite.

Five grams of arsenic acid were dissolved in 100 grams of distilled water, and the solution was divided into two equal parts. The first part was heated to boiling during five minutes with 0·50 gram of oxalic acid; the second part, after having been exactly neutralized with caustic soda, was treated in the same manner. To the two liquids were afterwards added a few drops of sulphuric acid and then sulphydrate of ammonia. In both cases a precipitate was produced *immediately*: in the acid liquid a greyish-yellow one of sulphur; in the neutral liquid a distinctly yellow one of trisulphide of arsenic.

I have also repeated an experiment that I had already made previously. One gram of neutral

* Read at an Evening Meeting of the Pharmaceutical Society, November 1, 1882.

arseniate of soda, dissolved in 50 grams of distilled water, was boiled during ten minutes with 1 gram of oxalate of lime; the hot liquid, filtered and acidulated, yielded *at once* a precipitate of trisulphide of arsenic of a fine yellow colour.

A mixture of solutions of neutral arseniate of soda and oxalate of ammonia, boiled during two or three minutes only, then acidulated, gives with sulphydrate of ammonia a yellow precipitate. The same mixture, not boiled, but acidulated, gives with sulphydrate of ammonia a milky turbidity of sulphur, which by boiling is contracted into greyish-yellow flocks. The reactions have appeared to me so distinct that I have not thought it necessary to study them more minutely.

From the experiments of Messrs. Naylor and Braithwaite, and my own, I conclude that oxalic acid does not exercise a reducing action upon free arsenic acid; but that when that acid is combined with an alkali it is reduced by oxalic acid to arsenious acid, and the reduction is more complete in proportion to the perfectness of the neutrality of the medium in which it is effected. So that the gentlemen who have contradicted me, notwithstanding their good intention, have failed to place themselves within the conditions described by me.

The idea never occurred to me to examine the action of oxalic acid upon uncombined arsenic acid: *à priori*, I should have thought, I must say, that it was the same as upon arseniates. My original memoir, published in the *Bulletin No.* 1 *de la Société des Pharmaciens de l'Eure*, which is in the library of the Pharmaceutical Society, is entitled, "Recherche des Arséniates dans les Sels alcalins." The extract which was published in the *Répertoire de Pharmacie*, in 1875, is entitled, "Recherche des Composés arsénicaux dans les Sels alcalins." Lastly, in the book to which Messrs. Naylor and Braithwaite have made allusion, in every place where arsenic acid is in question, it is always understood that it is the acid combined with alkalies that is referred to; it could hardly be found mixed with other salts except in that state.

[*The discussion on this paper is printed at p.* 377.]

NOTE ON TINCTURA CAMPHORÆ COMPOSITA.*

BY J. BLAND.

For some years past I have had a difficulty in preparing this tincture, which has, I daresay, occurred to others.

By a little care in the manipulation, the whole of the oil of anise should be soluble in the proof spirit directed by the Pharmacopœia, as was shown by Mr. Ince in an early volume of the *Pharmaceutical Journal*, and until about the time of the issue of the first British Pharmacopœia I had no trouble in getting a satisfactory solution. Since then I have found that a great part of the oil of anise separated, and although the deposit could by the aid of the powdered opium be readily filtered out, it was yet evident that a part only of the oil of anise was contained in the finished tincture.

After many failures to account for this result, it struck me that the oils of *Pimpinella anisum* and *Illicium anisatum*, though similar, might not be identical; and this proved to be the case.

In the London Pharmacopœia, the oil of *Pimpinella anisum* alone is official, and is stated by Phillips to be sometimes "adulterated" with oil of star-anise; the B.P. recognizes both oils as official, and, from the difficulty I had in procuring an authentic sample of the former oil, I infer that practically the whole of the oil of aniseed of commerce is derived from star-anise.

Whether the chemical and therapeutical properties of the two oils are identical, perhaps requires further investigation, but considering the statements that have been made as to the poisonous properties of the oil of the *Illicium religiosum*, and the comparative insolubility of the oil of star-anise in proof spirit, I would suggest that the oil of *Pimpinella anisum* should be preferred for medicinal use.

[*The discussion on this paper is printed at p.* 378.]

* Read at an Evening Meeting of the Pharmaceutical Society, November 1, 1882.

THE AVERAGE AMOUNT OF CAFFEINE IN THE GUARANA OF COMMERCE AS COMPARED WITH THAT IN THE SEEDS, ETC.*

BY J. H. FEEMSTER, CINCINNATI.

In reply to this query I shall take up three questions in the order presented:

1. What is the average amount of caffeine in the guarana of commerce as compared with that of the seeds?

From a select sample of seeds procured from Messrs. Lehn and Fink, of New York, I obtained five and eight-hundredths (5·08) per cent. of caffeine. Taking this as a basis of comparison five samples of guarana of the usual cylindrical form were purchased from as many dealers, and with these analyses were conducted with the appended results. Five hundred grains guarana used in each case.

No. 1	yielded 21 grs.	caffeine, or	. .	4·2 per cent.
No. 2	„ 25 „	„	. .	5·0 „
No. 3	„ 21 „	„	. .	4·2 „
No. 4	„ 19·5 „	„	. .	3·9 „
No. 5	„ 21·5 „	„	. .	4·3 „

The aggregate yield of caffeine from the five samples was one hundred and eight (108) grains, making the average per cent. of the five determinations four and thirty-two (4·32) hundredths.

2. Determine a rapid and pharmaceutically correct method of getting at the percentage of caffeine from guarana.

The process employed in securing the above result was that recommended by Professor E. S. Wayne, for the extraction of caffeine from tea (*American Journal of Pharmacy*, 1875, p. 135), and afterwards used so successfully upon guarana by Francis V. Greene, U. S. Navy (*American Journ. Pharm.*, 1877, p. 337; *Pharm. Journ.*, [3], viii., 87).

The directions for conducting the analysis are so full and explicit in the article of Mr. Greene, that it would seem unnecessary to repeat them, but I will mention that the addition of a few drops of liquor plumbi subacet. to the boiling mixture of guarana, litharge and water, when the colour begins to disappear from the solution, seems to facilitate the deposition of the insoluble portion, and to leave the liquid more free from colouring matter.

The crystals of caffeine from the solution thus treated are so white that recrystallizing from diluted alcohol is done away with.

The guarana and litharge require to be boiled about three hours before the solution upon the subsidence of the solid matter remains clear, and I was surprised to find when operating with the seeds that the change takes place in less than one hour.

The cause of this I leave open for future investigation

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

A plan for the extraction of caffeine from guarana tea or coffee, more free from objection than the one proposed by Professor Wayne, would be found with difficulty.

It is so free from complications, and can be conducted with such rapidity and accuracy, that it is without hesitation I recommend it as the one best answering the second portion of this query.

3. Give the most desirable alcoholic menstruum that is adapted to the extraction of caffeine and the preparation of fluid extract of guarana.

Sixteen troy ounces of guarana in moderately fine powder was moistened with two (2) ounces of menstruum composed of alcohol, three (3) fluid ounces, glycerine, four (4) fluid ounces, and water five (5) fluid ounces.

The drug was packed in a conical glass percolator, the remainder of the 12 fluid ounces of menstruum poured on, and after the liquid had disappeared from the surface it was followed with a mixture of alcohol, 4 fluid ounces, and water 12 fluid ounces.

When the liquid began to drop from the lower orifice a cork was inserted, and maceration continued for two days. The percolation was then proceeded with, the first 12 fluid ounces reserved, and 2 pints more of percolate collected, the last portion of which was void of colour and taste. This was evaporated to 3 fluid ounces added to 1 ounce of alcohol and mixed with the 12 fluid ounces reserved, to make 1 pint of finished fluid extract.

The finished fluid extract kept bright and free from deposit for several months, but after that time a heavy chocolate-coloured precipitate formed, and upon examination was found to contain groups of crystals of caffeine. (Sample submitted.)

The exhausted guarana was removed from the percolator, and after drying thoroughly, tested for caffeine yielding about 1 per cent.

Four additional experiments were made with the following menstrua:—No. 2 contained five (5) fluid ounces of alcohol; No. 3, six (6) ounces; No. 4, seven (7) ounces, and No. 5, eight (8) ounces; the proportion of glycerine corresponding in each case to that used in experiment No. 1.

What I have said concerning experiment No. 1, can be repeated as to Nos. 2, 3, and 4, except that the deposit was diminished as the quantity of alcohol was increased, No. 4 being very slight.

No. 5 containing fifty (50) per cent. of alcohol and four (4) fluid ounces of glycerine to the pint makes a fluid extract which I regard as a true representative of the drug, and the menstruum as containing the least quantity of alcohol in association with glycerine that can be credited with giving good results. Dilute alcohol without glycerine is not free from the objection mentioned in connection with menstrua Nos. 1, 2, 3 and 4, viz., its liability to deposit.

In proof of this I submit a sample from a lot made in November, 1880, containing 50 per cent. alcohol, but without glycerine.

THE HISTORY OF CITRINE OINTMENT.*

BY R. A. CRIPPS,

Bell Scholar in the School of Pharmacy of the Pharmaceutical Society.

A short time ago I was asked by Professor Attfield to reply to some queries which had been put to him by Mr. Adolf G. Vogeler, of Chicago, respecting citrine ointment. I gladly undertook the work, and the outcome is the present paper. Mr. Vogeler concurs in my wish to read it before this Association.

The preparation known as citrine ointment has from time to time been prepared from numerous and widely-differing formulæ.

The first notice of it is found in the London Pharmacopœia of 1650, a most complicated formula being given to it; among the ingredients may be mentioned white coral, limpet shells, tragacanth, quartz, white marble and white lead, made upon a basis of hog's lard, suet and hen's grease. How such substances could be made into a presentable ointment is difficult to imagine, when we remember how little apparatus was at the command of the pharmacist of that day. It is said to have been used in many skin diseases and for freckles.

In the London Pharmacopœia of 1668 the formula remains the same, while in those of 1678 and 1682 several of the ingredients are omitted, sugar of lead replaces carbonate, and rose water, frankincense, and citron bark are added. The Edinburgh Pharmacopœia of 1722 orders under the same name an ointment of an entirely different nature, the formula being:—

℞ Hydrargyri . . . . . unciam unam.
Spiritus nitri . . . . . q.s.
Ut fiat solutionem, cui adde paulatim
Axungiæ porcinæ liquefactæ. libram unam.
Misce. Fiat unguentum.

It was not till long after this that a citrine ointment containing mercury was admitted to the London Pharmacopœia, perhaps from the fact that with a formula such as the above very varying results were naturally obtained; indeed we find no mention whatever of it in the London Pharmacopœia of 1724, while in that of 1746 it is similar to resin ointment with the addition of 1 oz. of yellow wax to each 8 ozs.

Quincy, in the 'London Dispensatory' of 1730, gives a similar formula, viz.:—

Yellow resin . . . . . ½ lb.
Sheep's suet . . . . . 4 ozs.
Turpentine . . . . . 2 ozs.

To be melted together and strained. No doubt the pharmacist thought this a vast improvement on the former ointment so difficult to prepare; but he was not long to remain in this state of ease as regards citrine ointment, for in the London Pharmacopœia of 1787 a new formula was given to it which bade fair to cause him more trouble than the last.

Some say it was introduced in imitation of the well-known "golden eye salve," but others state that it was of French origin, having been used in Paris for the cure of the itch. If the former were the case, it was not satisfactory, "golden eye salve" being an ointment of yellow oxide of mercury.

The formula was:—

℞ Hydrargyri pur. . . . . unciam unam.
Acidi nitrosi . . . . . uncias duas.
Axungiæ præp. . . . . libram unam.

Dissolve the mercury in the acid, and then mix the boiling liquid with the lard previously melted, remove from the dish and allow to cool. The same formula was used in the Edinburgh Pharmacopœia of 1792, but it was ordered to be stirred diligently during the cooling; a milder ointment was also official, containing half the quantity of lard. In 1803 the Edinburgh Pharmacopœia ordered 12 ozs. of lard instead of 16, the milder ointment containing three times that amount. Notwithstanding these continued alterations the ointment was still very unsatisfactory, it varied greatly with the temperature employed in preparing it, and after keeping usually became grey with greenish patches, and so hard that it could sometimes be powdered. This was stated to be due to the oxidation of the lard by the nitric acid, and many other substances were tried as a basis, among which the most important were butter, olive oil, and neat's foot oil. Accordingly we find in the Edinburgh Pharmacopœias of 1807, 1809, 1813 and 1817 a formula having as a basis 1 part lard to 3 parts of olive oil; in that of Dublin, 1807, 1 of lard to 4 of oil; and London, 1809, 2 parts oil to 3 of lard: still the results were quite unsatisfactory, and many were the theories propounded to account for the changes to which it was liable, excess of nitric acid, deficiency of nitric acid, too high or too low

* Paper read before the School of Pharmacy Students' Association, June 22, 1882.

a temperature, the presence of salt in the lard, impure mercury, and a fatty basis of unsuitable nature, all received their supporters. Acting upon the first of these theories the authorities of the London Pharmacopœias of 1817, 1824, 1836, and 1851 ordered 11 drachms of acid in place of 2 ounces, the formula of the last being :—

℞ Hydrarg. pur. . . . . ℥j.
Acid. nitric. . . . . ℥xj.
Ol. olivæ . . . . . ℥iv.
Adipis præp. . . . . ℥viij.
Ft. unguent.

They also ordered a milder ointment, containing 1 part of strong ointment to 7 of lard. The Dublin Pharmacopœia of 1850 also orders less acid, while those of Edinburgh, 1839 and 1841, direct a larger quantity.

The British Pharmacopœia of 1864 gives the following formula :—

Take of—

Mercury	4 ounces.
Nitric acid, sp. gr. 1·5 . . .	8 „
Lard	15 „
Olive oil	32 „

Dissolve the mercury in the acid with the aid of a gentle heat, melt the lard in the oil, by a steam or water-bath in a porcelain vessel capable of holding six times the quantity, and while the mixture is hot, add the solution of mercury, also hot, mixing them thoroughly; if the mixture does not froth up, heat till this occurs.

The B.P. of 1867 orders 12 ounces of nitric acid, sp. gr. 1·42.

This formula will give an excellent ointment, and when complaints are made of the result it will be found that the fault is in the operator not in the formula. The instructions must be strictly adhered to, or a failure will probably result, and especial regard must be paid to the temperature at which the mixture is made, which should range from 180°–200° F., and should not be too long continued, but only until the ointment froths up well; if large quantities be made the temperature may be a little lower. As thus prepared it is of a fine lemon-yellow colour, and keeps for a fair length of time, perfectly good

Such are the varied formulæ which have from time to time been given to this interesting ointment; but before leaving the subject I should like to devote a short notice to the chemistry of the preparation.

The views of chemists regarding the chemical composition of the ointment vary considerably. Evidently the original idea was to obtain an ointment of mercuric nitrate; hence the name given to it in the Pharmacopœias. But this was entirely a failure, for on adding the acid solution of nitrate to the melted lard chemical decomposition occurs, as indicated by the frothing. Still, this was considered as simply the result of the oxidation of the fat by the excess of acid; but Mr. Schacht, who made a number of experiments in the laboratories of the School of Pharmacy, showed that the ointment, when carefully prepared, is soluble in ether, thus indicating that the mercury exists as some compound with a fatty acid, the nitric acid in combination with the mercury being in some way retained while the excess is evolved during effervescence. In Mr. Schacht's valuable paper (which will be found in the *Pharmaceutical Journal*, [1], vol. iv., p. 450), he also states that the failure in obtaining a good ointment is not due to the presence of salt in the lard, or of lead in the mercury, and that ointment spoiled by keeping may be restored by warming with nitric acid, thus indicating that nitric acid is essential to its preservation, and that by keeping some of the acid is lost.

But in the *Pharmaceutical Journal*, [3], vol. vi., p. 708. in a paper by Mr. Fredigke, of Chicago, it is stated that a superior ointment both in appearance and in durability may be prepared by oxidizing the fat by nitric acid, previous to adding the mercurial solution. This would seem to show that the oxidized fat forms a compound with the mercuric nitrate, the colour being due to the elaidin formed by reaction of fat and acid.

Such then are the results of their experiments; but as they are to a great extent conflicting, it is impossible to arrive at any definite conclusions without experimental research, and pressure of time debarred me from such a course, so that I have been obliged to leave the subject with this historical sketch.

THE POISONOUS CONSTITUENT OF ANDROMEDA JAPONICA, THUNBERG.*

BY PROFESSOR J. F. EYKMAN.

Among the many plants belonging to the natural family Ericaceæ and the genus Andromeda, indigenous to Japan and China, is *Andromeda japonica*, Thunberg, an arboraceous shrub, commonly regarded as poisonous by the Japanese, and mentioned as such even in the oldest Japanese works on natural history. The investigation of this plant appeared to be very interesting, from a toxicological point of view, since the natural family of Ericaceæ furnishes only a limited number of poisons, and those but little known.

What is recorded in the Japanese or Chinese literature regarding this plant may be comprised in the following:—

The oblong, bitter, and astringent leaves are poisonous and have a stupefying or deadly effect upon horses and cows which eat them. Hence the plant is named *basuiboku*, *makuwasu*, also *shikaku kuwasu*, and *sishi kuwasu*.†

A decoction of the leaves kills insects and worms, also the pediculus capitis.‡ It is used as a wash in ulcerations and in scabies, and as an antidote against *fugu*.§ The finely-powdered leaves are used as a remedy in snake-bite; and the odour of a decoction of the leaves causes headache to human beings.‖

The plant grows everywhere upon the mountains, is evergreen, and is, for this reason, used as an ornamental plant. It reaches a height not exceeding seven, and usually only two metres. A whole series of names is used for it in the different provinces; they are chiefly recorded in the 'Honzokomoku keimo of Ono.'¶

Of these, *asebu* and *basuiboku* are the Chinese names most in use; *shin-boku* and *tin-shu-kwa* are names given from the globular form of the flower;** and *bei-han-kwa*,†† from the resemblance of the flower to boiled rice.

E. Kaempfer, in his 'Amœnitates Exoticæ,'‡‡ describes this plant already in a somewhat detailed manner, under the names *asjebo* and *asjemi*; but Thunberg was the first who gave a complete description, besides a good illustration of the flowering plant.§§

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* Translated from the author's manuscript. Reprinted from *New Remedies*, October, 1882.

† *Ba*, horse; *sui*, stunning; *boku*, tree.—*'ma'* horse; *kuwasu*, not eat.—*shikaku*, deer;—*sishi* is a collective name for wild animals, also wild hogs and for lion. Thunberg, in his 'Flora Japonica,' mentions also the name *sishi-gakure*; *gakure*=to conceal, to hide one's self, on account of the dense foliage of the shrub.

‡ According to the 'Honzokomoku keimo' (the commentary of the 'Honzokomoku' by Li-shi-shin).

§ From this it is also called *fugu shiba*; *fugu*, poison-fish; *shiba*, plant.

‖ According to the 'Yudoku somoku susetsu' (Explanation and Illustration of Poisonous Plants). It is also stated in this work, that deer, after eating the leaves suddenly lose their antlers. In Li-shi-shin's 'Honzokomoku' is also found the statement that a decoction of the leaves drives off the impure blood, in women, after childbed.

¶ On all these works, and some others of similar nature, see the article on Japanese Medicine and Pharmacy, *Pharm. Journ.* [3], vii., 674.

** *Tin*, peculiar; *shu*, ball; *kwa*, flower.

†† *Bei*, rice; *han*, food; *kwa*, flower.

‡‡ 'Fascic.,' v., p. 896, Pl. 1712.

§§ 'Flora Japonica,' p. 181, Pl. 1784.

The poisonous principle is extracted from the fresh leaves in the following manner:—

The leaves are infused with water, and the strained liquid evaporated on a steam-bath to a thin syrup. The latter, which has a brownish-red colour, is filtered and then shaken, several times in succession, with chloroform. The chloroformic solution, which has a faint greenish-yellow colour, is reduced, by distillation, to a small volume, and petroleum spirit added to the residue, until nothing further is thrown down by it. The separated amorphous substance is dried, and then dissolved in ether containing alcohol; this solution is shaken with water, the watery liquid, which is almost entirely colourless, separated from the yellow ethereal layer, and evaporated at a moderate heat. There is left, as residue, a soft, light yellow, amorphous mass, which, by a gentle heat, dries up to a transparent substance, colourless in thin layers. I have tried in various ways and by using different solvents, to cause this substance to crystallize, but at no time could there be observed even a trace of crystals. The substance is always obtained in the same condition, so that I considered myself justified in assuming to have under my hand a pure, homogeneous substance. In addition to the above treatment, the powdered substance was thoroughly extracted with petroleum spirit, and afterwards with benzol, the residuary powder again dissolved in ether mixed with some alcohol, and the colourless solution once more shaken with water. Upon evaporation of the aqueous liquid, at a moderate temperature, there was again obtained an amorphous substance of precisely the same properties as before. After having been partially dried on the water-bath, it was reduced to powder, and the latter subjected to ultimate analysis (I. and II.). Another portion was partially extracted with absolute ether (free from alcohol) in which it is only slightly soluble, and thus divided into two fractions. Analyses were also made both of the fraction left undissolved by the ether (III.), and of that which the latter had dissolved and left behind on evaporation (IV.).

I obtained the following results:—

I. 0·2732 gram, dried at 110° to 115° C., yielded 0·2631 gram of dry substance, and after combustion, 0·5815 gram of CO_2 and 0·1983 gram of H_2O.

II. 0·3288 gram, dried at 110° to 115° C., yielded 0·3181 gram, and after combustion, 0·7073 gram of CO_2 and 0·2087 gram of H_2O.

III. 0·3575 gram of the fraction left undissolved by ether after being dried at 110° to 115° C., yielded 0·7929 gram CO_2 and 0·2368 gram H_2O.

IV. 0·3898 gram of the fraction dissolved by ether, after being dried at 110° to 115° C., yielded 0·8651 gram of CO_2 and 0·2610 gram H_2O.

These results, expressed in percentage, calculated upon the *dry* substance, represent:—

	I.	II.	III.	IV.	Mean.
Carbon (C=12)	60·28	60·64	60·49	60·52	60·48
Hydrogen (H=1)	7·53	7·29	7·36	7·44	7·405
Oxygen (O=16).	32·19	32·17	32·15	32·04	32·115
	100·00	100·10	100 00	100·00	100·000

The agreement of the figures under III. and IV. among themselves and also with those under I. and II. confirm the belief that we have here a homogeneous definite principle, and not a mere mixture.

I have chosen the name *asebotoxin* for the substance.

Properties of Asebotoxin.—It is a colourless substance, soft while moist, but brittle and transparent when dried at a gentle heat. When covered with water, it cakes together, becomes soft below 100° C., but does not melt until the temperature 120° C. is reached, and then forms a transparent light-brown mass. It is only slightly soluble in cold, more readily in hot water, and very easily in alcohol, amylic alcohol, glacial acetic acid, and chloroform. These solutions have a neutral reaction. Ether, free from alcohol or water, dissolves it but sparingly; but it is readily soluble in ether mixed with alcohol. Petroleum spirit, benzol, and disulphide of carbon do not dissolve it at all, or only in very small quantity.

Water of ammonia dissolves it tolerably well, solution of soda less easily. The watery solution is neither precipitated nor altered by ferric chloride, sulphate of copper, mercuric chloride, chloride of gold, nitrate of silver, or even solution of acetate of lead. But basic acetate of lead causes a white flocculent precipitate.

When heated with alkaline copper solution, and still more, after being first heated with diluted sulphuric acid (the resinous precipitate being removed by filtration), it causes a separation of red cuprous oxide (Cu_2O). Asebotoxin, therefore, belongs to the glucosides; it contains no nitrogen. On combustion it produces vapours which excite coughing, then chars, and is consumed without leaving a residue. The aqueous solution has a bitter taste, and produces a strong tingling upon the tongue.

I found the fatal dose for rabbits to be 3 milligrams (about $\frac{1}{20}$th grain) for each kilogram of the animal, by hypodermic injection.

Weight of rabbit in kilos.	Asebotoxin injected in aqueous solution.	Dose calculated for each kilo of the animal.	Result.
3·24	9·5 milligr.	2·9 milligr.	Death in $1\frac{3}{4}$ hour.
2·80	5·5 „	2·0 „	Recovery after several hours.
1·35	4·5 „	3·3 „	Death in 1 hour.
1·28	3·6 „	2·8 „	Death in 3 hours.
1·25	2·5 „	2·0 „	Recovery after several hours.

The observed external symptoms are chiefly the following:—After administering a dose, of about the fatal limit, the rabbit is seized, in about fifteen to twenty minutes, by a strong trembling, and begins, while producing snarling or groaning sounds, to make slight retractive motions with the head. These become gradually more intense; the forward movement of the head being made with wide-open mouth, and accompanied by a smacking, sucking sound; the nostrils being widely opened. Sometimes diuresis or defecation are observed. Now and then the animal suddenly springs up and runs around anxious and groaning. The temperature of the body diminishes sensibly; by degrees, the animal loses its power of motion, and lies on one side. Next, there appear symptoms of paralysis in the extremities, the mucous membranes of mouth and nostrils appear very anæmic, and exude mucus, and, after some convulsions, the mouth and nostrils being wide open, death supervenes, under symptoms of cyanosis, apparently by suffocation.

In the rabbit which weighed 3·24 kilos, I observed, shortly before death, a strong exudation of a milky turbid liquid in the eye.

Dogs begin to vomit soon after the poison is injected.

The differences are entirely analogous to those which are observed after injecting a watery infusion of the fresh leaves. One cubic centimetre of this infusion, corresponding to about 200 milligrams of fresh leaves, kills rabbits of about 1·25 kilo within a few hours, and, therefore, agrees in effect with 3 to 4 milligrams of asebotoxin.

Asebotoxin exhibits some fine colour-reactions, which are of importance toxicologically. If an alcoholic solution of the substance be poured into a watch-glass and strong hydrochloric acid be added, a *magnificent blue*

colour is gradually developed, and, at the same time, a peculiar odour resembling that of *Spiræa ulmaria*. On evaporating the blue solution on a water-bath, a fine violet-red tint developes itself at the edge of the liquid. If the blue solution be left to itself, it turns after some time to reddish-grey, and the liquid becomes turbid from the separation of a bluish-grey substance. Concentrated sulphuric acid dissolves asebotoxin with a red colour, which becomes, after some time, fine rose-red, while the liquid is rendered turbid from the separation of a bluish-grey substance. If asebotoxin be boiled with diluted hydrochloric acid, the liquid assumes a fine rose-red colour, and a brown resinous substance separates. The same effect is produced by diluted sulphuric acid. The above mentioned peculiar odour is also noticeable during the last named reactions.

CITRATE OF IRON AND QUINIA.*

Complaint is very often made of the difficult solubility of the officinal citrate of iron and quinia of the United States Pharmacopœia, and it is very often erroneously said to be insoluble. Such complaints and statements are simply due to the faulty teachings in materia medica and pharmacy and faulty practice in therapeutics.

As long ago as the revision of the Pharmacopœia of 1860 it was recognized that the bitterness of quinia preparations, both to the palate and in the stomach, was in many cases destructive of appetite in sensitive patients, and, therefore, when given as a tonic this bitterness in a measure defeated the quinia. Hence a preparation of iron and quinia was adopted, containing a large and effective proportion of quinia, which, when well dried, was so slowly soluble that it could be easily given, either in form of pill or powder or suspended in syrup, to women and children, or in the most delicate conditions of palate or stomach, with but slight bitterness. Such a preparation passed over the palate easily, and when in the stomach dissolved and was assimilated slowly and easily with the least possible shock—for intense bitterness is as shocking and as disturbing to many stomachs as intense acidity or alkalinity is. This preparation, when taken between the teeth, feels almost like so much sand, and its solubility and bitterness are developed so slowly that although containing about 11 per cent. of quinia, it is often condemned as containing no quinia at all. And when stirred up with water it at once settles out, leaving the water colourless and tasteless, or nearly so, in proportion to the time allowed, and it is often at once discarded as useless, and letters written about it which have some of the bitterness in which it is supposed to be deficient, the fact being all the while that it is entirely soluble even in its own weight of water, but only very slowly soluble, as it should be and was intended to be. For a long time after its introduction to the Pharmacopœia it was used as was intended in powder, pill or syrup, and attained the high character which it has always so well deserved, but gradually, through defective teaching or through want of thought, physicians began to make the mistake of prescribing it in solution. Then those physicians and pharmacists who had skill enough and patience enough to get it into solution by tying it up in a cloth and suspending it in the water and setting it in a warm place for some hours, found they had a dreadfully bitter solution, and one which in a short time became mouldy, as all salts with organic acids will. To avoid this slow and troublesome solubility and some of the intensity of bitterness, the manufacturers soon supplied a preparation by exactly the same name, wherein, by the addition of citrate of ammonia, a readily soluble salt of similar appearance with less bitterness was supplied at a lower price. Of course this contained a smaller proportion of both iron and quinia and a larger proportion of citric acid and water; but this escaped attention so long as the preparation had the desired solubility, the diminished bitterness in solution, and was sold at a lower price. This new preparation, unofficinal, though called by the officinal name, was for a time designated as soluble citrate of iron and quinia —not so much for the purpose of indicating any difference of composition as for the purpose of distinguishing it in order so as to avoid the objectionable insoluble salt of the Pharmacopœia. But after a while it almost entirely usurped the place as well as the name of the better preparation, and it holds these at this time so firmly that perhaps a hundred ounces of it are sold to one of the original officinal preparation, while the latter is really much more valuable, and as valuable, therapeutically, to-day as it was in 1860, when adopted by the Pharmacopœia; and the reasons for its adoption are as good and as sound to-day as they were then, only the pecuniary profits upon it are less than on the more dilute and soluble preparation. So little is the better agent used now in proportion to the weaker one that in the present revision of the Pharmacopœia there was but a feeble opposition to the adoption of a formula for the weaker preparation, while some effort was needed to prevent the dismissal of the older and better salt.

The ground that the Pharmacopœia must follow the usage and requirements of physicians in general, even when the latter do fall into errors, may be the only safe general rule; but unless there be a multitude of exceptions it is not a good rule for the highest and best interests of the art of medicine. It has always been the rule of the manufacturer and is well illustrated in the history of citrate of iron and quinia, but this history also illustrates that what is a good rule for the manufacturer may even satisfy a large majority of physicians, without being a good rule for their patients.

Beside all this, there is one point in the history of this preparation that is difficult to comprehend. The officinal salt is tasteless when given in a well-made uncoated pill, and is very nearly tasteless when in powder or suspended extemporaneously in any thick liquid as mucilage or syrup, and the constant demand of late has been for tasteless medicines, or, at least, those which are not nauseous. So prominent is this demand that physicians are often heard to complain that they lose their practice to homœopathy, etc., because their medicines are not made less disagreeable. Yet here in the case of this valuable agent, within twenty years a large majority of the whole profession has abandoned the tasteless form of it, and gone over to an inferior preparation, so as to give it in a solution which is very bitter, and which would be very justly objectionable to their patients if these knew they could take a better preparation in a nearly tasteless condition.

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INFLUENCE OF PEPTONES AND CERTAIN INORGANIC SALTS ON THE DIASTATIC ACTION OF SALIVA.*

BY R. H. CHITTENDEN AND J. S. ELY.

Recent experiments† on the diastatic action of saliva under various conditions have revealed the fact that human mixed saliva in the presence of an equal volume of artificial gastric juice containing 0·05 per cent. of hydrochloric acid, is capable of forming, from a given quantity of starch, a much larger amount of sugar than the same quantity of saliva alone can do under a like degree of dilution; this being the more remarkable when it is remembered that the same percentage of acid by itself greatly retards the diastatic action. This somewhat curious fact has led us to study the individual

* From the *American Chemical Journal*.

† Chittenden and Griswold, *American Chemical Journal*, iii., 305.

influence of several bodies of physiological importance on salivary fermentation. It is our conviction that many of the digestive processes of the body are more dependent for their fullest action on the stimulating or other influence caused by the mere presence of many of the digestive products than has hitherto been supposed. Experiment, to be sure, has revealed the fact that several of the products of digestion when present in the digestive mixture in excess, notably sugar in the case of salivary digestion and peptones in gastric digestion, retard the digestive process. Under ordinary circumstances, however, all conditions are favourable, in the normal body, for a rapid absorption of the digestive products, and thus any excessive accumulation is prevented. Schmidt-Mülheim* found in his recent study of proteid digestion, that in the case of dogs, the quantity of peptones present in the stomach was practically the same at all times during the digestion; thus, one, four, and six hours after feeding a dog, 61 grams of albumin, the stomach contained 3·08 grams, 3·31 grams, and 2·91 grams of peptones respectively, which would seem to indicate that after the formation of a definite quantity of the digestive products the transportation of these bodies keeps pace with the digestion. Again, there are no facts to warrant the belief that the products of one digestive process necessarily hinder the action of some other allied ferment; indeed, it is ordinarily understood that any accumulation of the digestive products simply hinders the action of that particular ferment by clogging the digestive fluid.

There is nothing inconsistent then in the statement that the products of one digestion may act as a stimulant to some other digestive process. The results of the experiments about to be described show plainly that *peptones, a product of gastric digestion, exercise a decided influence on salivary digestion, stimulating the ferment to increased action, particularly in the presence of acid which by itself completely prevents the conversion of starch into sugar.* If now we are led, in virtue of this fact, to infer that there may be a possible continuation of salivary digestion in the stomach, it follows that the ferment must act at the first period of digestion, when the acid fluids are exceedingly weak. The fact that the quantity of peptones present in the stomach at this stage of digestion may be quite small offers no objection whatever to a possible action of the peptones, since the experiments already quoted, and those about to be described, well illustrate how extremely sensitive the saliva is to a change of conditions, however slight; thus even minute quantities of inorganic salts, even to the extent of only 0·015 per cent., exercise a decided influence on ferment action.

We may also reasonably infer that the saliva is, to a certain extent, a type of the other diastatic fluids of the body, and that the ferment itself is doubtless similar in its action to other like ferments, notably the ferment or ferments of the liver, which presumably convert the glycogen of the hepatic cells into sugar. Thus conditions which modify the diastatic action of saliva may not be wholly without similar influence on other like ferments. It has, therefore, seemed to us that the results of our work may have some bearing upon the recently published experiments of Seegen,† of Vienna, who found that when an aqueous solution of peptones was poured over a small piece of fresh liver, the quantity of sugar formed in a specified time was greater than in a piece of the same liver treated in a like manner but without peptones; at the same time, however, the total amount of carbohydrate matter appeared to be increased in the presence of the peptones. Finding that the peptones themselves had no diastatic action on glycogen, Seegen then concluded that the liver possesses the power of transforming peptones into sugar and carbohydrates which are capable of being converted into sugar. While our results may in nowise affect Seegen's conclusions, they certainly suggest the possibility that the increase of sugar noticed in the presence of the peptones may be due, in part at least, to some cause other than that attributed by Seegen.

We have attempted at first in our experiments to ascertain whether by themselves or under such conditions as may presumably exist in the body, peptones have any influence on the conversion of amylaceous matter into sugar by the saliva. The amylaceous material employed was starch and glycogen, while the diastatic agent was human mixed saliva, which was usually collected in quantities of 150–250 c.c. by the chewing of some tasteless substance, then filtered and thoroughly mixed before using. The saliva was ordinarily used an hour or two after collecting, and being as a rule always furnished by the same person, possessed approximately the same strength, although control experiments with starch and saliva alone under a like degree of dilution were made in each case. The method employed consisted in dissolving a weighed amount of starch or glycogen in 25 c.c. of water, then adding 50 c.c. of water or other fluid in which a weighed quantity of peptone or other substance was dissolved, and lastly, 25 c.c. of filtered saliva. The mixture, consisting of 100 c.c. of fluid, was then warmed for a definite time, usually forty-five minutes, at 40° C., when further action was prevented by boiling the mixture. The fluid was then diluted with water to 500 c.c., and when thoroughly mixed, 50 c.c., or one-tenth of the filtered fluid, was precipitated by cupro-potassium tartrate according to the method of Maercker, described in another place.* The copper was weighed as metallic copper, from which the percentage of reducing substance calculated as dextrose was determined by the use of Maercker's tables.

Influence of Peptones in Aqueous Solution.

The peptones employed were prepared especially for the purpose and were made as pure as possible. Three samples were prepared from thoroughly washed blood-fibrin by the action of an active gastric juice made from a glycerine extract of pepsin and 0·2 per cent. hydrochloric acid, while the fourth was made from coagulated egg-albumin by the use of a similar gastric juice. All four preparations were the products of an active digestion, and were therefore free from syntonin or other preliminary products. The peptones were purified by repeated precipitation and standing under alcohol and ether, while the fourth was especially purified from soluble salts by dialysis. The following results show plainly the action of the peptones. In each experiment 1 gram of the dried peptones dissolved in 50 c.c. of water was added to 1 gram of starch previously boiled with 25 c.c. of water, the 25 c.c. of saliva making a digestive mixture of 100 c.c., in which the peptones were present to the extent of 1 per cent. In the control experiment the mixture was made up to the same volume with water. Different saliva was used in each experiment.

	Without peptones.		With peptones.	
Number of experiment.	Wt. Cu in one-tenth. Gram.	Total amount of sugar. Gram.	Wt. Cu in one-tenth. Gram.	Total amount of sugar. Gram.
1.	0·0896	0·4557	0·0962	0·4893
2.	0·0911	0·4633	0·0974	0·4954
3.	0·0915	0·4654	0·1045	0·5315
4.	0·0904	0·4598	0·0977	0·4969
5.	0·0856	0·4354	0·0937	0·4766
6.	0·0835	0·4247	0·0949	0·4826

(*To be continued.*)

* *Untersuchungen über die Verdauung der Eiweisskörper*, Du Bois Reymond's *Archiv f. Physiologie*, 1879, 39.

† *Die Einwirkung der Leber auf Pepton*, Pflüger's *Archiv*, xxv., 165.

* *American Chemical Journal*, iii., 307.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 4, 1882.

SPURIOUS AND WORTHLESS DRUGS.

We are glad to learn, from the report of the proceedings at the meeting of the Council on Wednesday last, that a subject to which attention has been called repeatedly in the pages of this Journal, namely, the frequent appearance of parcels of inferior or misnamed drugs in the market, is provoking consideration with a view to the practice being energetically dealt with. It was brought under the notice of the Council by Mr. Williams, who quoted as instances the mouldy ipecacuanha to which reference was made in this Journal last week, some jalap tubers that had been exhausted of resin, and balsam of tolu containing 40 per cent. of common rosin. These three examples fairly represent three varieties of objectionable drugs that are met with,—those that have become deteriorated from more or less natural causes, those that have been deprived of their active principles, and those that have been sophisticated by the addition of some extraneous substances. To these may be added parcels of drugs of vegetable origin which consist either partly or wholly of something which is not represented by the name given to them, such as the spurious senna, concerning which a warning was first given in this Journal some time since, the substitution of Japanese for star-anise, and the adulterations of senega and other drugs that have been since referred to. Mr. Williams further stated that several gentlemen connected with the wholesale trade wished the Society to take the matter up and use its influence in securing such measures as would put some check upon the questionable practice.

The question seems to have given rise to considerable discussion, which was terminated by the Council appointing a Committee to consider the subject of the sale by auction of spurious and worthless drugs and to report on a future occasion as to the steps it would recommend to be taken with a view of checking the practice. It will be obvious that this was a discreet course; for the subject will require to be carefully considered from every point of view, and before arriving at any conclusion the Committee will have to estimate not only its bearing on the object professedly in view, but also its influence in many other ways. Many of these points could not be well discussed in a formal public debate, and will stand a much better chance of having due weight given to them in the more informal proceedings of a committee. For instance, the proposition to appoint an inspector of drugs, with power to condemn and destroy what he might deem to be worthless or hurtful, is one that may well be looked upon with anxiety in respect to the powers that would have to be entrusted to such an officer in order to enable him to perform such a duty effectually. Then there is the difficulty of defining what should be deemed worthless or deleterious, a point that evidently would often depend upon the use to which the substance is put after its sale has been effected. For it must be admitted that whilst the appearance of a quantity of damaged drugs in the market might justly arouse suspicion, and their use for some purposes would deserve condemnation, nevertheless for other purposes they might be justifiably used, and, therefore, it would be hard to deprive their owners of their market value. Beyond this, there is a decided indisposition in the present day to interfere between sellers and buyers in restraint of trade in any way.

There is another consideration, too, that must not be lost sight of, and that is, the manner in which the demand for an inspector of drugs would affect public opinion as to the position and qualification of pharmacists. It is admitted that the members of the wholesale trade are not likely to be betrayed into purchasing as of good quality such articles as those to which reference has been made, and it is implied, perhaps, rather than stated distinctly, that the suggested appointment would be for the protection of the chemist and druggist who is unable or too busy to protect himself. But the question arises: How far will it be wise on the part of the chemist and druggist to accept such a position, especially at the present moment? It is true that after the crude drug is ground or otherwise disguised it may be more difficult to distinguish sophistications or substitutions. But will it be wise for the pharmacist, whilst on the one hand he claims to be entitled to take a higher status than the ordinary tradesman on account of the superior education and training that he has undergone with a view to specially qualifying him to deal in powerful drugs, on the other to declare that without extraneous assistance from the State he is as helpless, or nearly so, as the grocer or the manager of a co-operative store? The subject is a difficult one, but we do not think that it could be more fitly taken in hand by any body than the Committee to which it has been referred.

THE LOCAL GOVERNMENT BOARD ON THE SALE OF FOOD AND DRUGS ACT.

The Eleventh Annual Report of the Local Government Board, which was issued last week, includes the usual reference to proceedings taken under the Sale of Food and Drugs Act. In the first place it appears that there has been during the year a considerable increase in the number of municipal corporations which have complied with the provisions of the statute as regards the appointment of public analysts. In previous reports the Board had been able to say that all the county authorities and the several vestries and district boards of works in the metropolis had made such appointments, but up to the end of the year 1880

only 156 municipal corporations had done so; now we learn that, as the result of steps taken by the Board, additional appointments have been made, and at the end of last year the total number of districts in which public analysts were acting was 260. In connection with this subject a question has arisen as to the duty of a town council that has entered into an agreement with the county authority for the "watching" of the town, concerning which the Board has been advised that in such a case it devolves upon the town council either to appoint an analyst or make an arrangement for the performance of analyses by an analyst holding an appointment in a neighbouring borough or for the county.

It would appear that the provisions of the Act as to the analysis of articles bought by private individuals are still almost ignored by the public, and the operation of the Act depends principally upon the extent to which the local authorities choose to exercise their power of procuring samples for analysis, only 358 having been purchased by private individuals during the year. The result is said to be that while in some districts the Act is well enforced, in others it is almost a dead letter, and it is remarked that the town councils, of the smaller boroughs especially, appear generally very unwilling to entertain a suspicion that the articles sold in their districts may possibly be adulterated.

The total number of analyses reported upon during the year 1881 by public analysts in their official capacity was 17,283, and of these 5039, or two-sevenths, were made in the metropolis. Outside the metropolitan district the standard suggested by the Board, of the analysis of at least one sample for every thousand inhabitants of a district, was attained only in three counties and twenty-nine boroughs. On the other hand, the analyses reported from twelve counties only numbered fifty altogether, whilst from sixty-six boroughs the returns were absolutely *nil*. Of the 17,283 samples analysed, 2613, or 14·7 per cent. were reported as adulterated, being the lowest average percentage in any year since the Act has been in force, and 1 per cent. less than in 1880. The highest percentage of ascertained adulteration (28·4) is reported in "spirits other than gin" and next follows gin (25·9). Then at some distance (19·5 per cent.) comes milk, of which nearly seven thousand samples were reported upon, and next coffee (18·3 per cent.).

With respect to the foregoing classes, there is some precision as to the individuality of the articles examined and of their probable source, as well as of the nature of the adulterants, but there is no indication of one or the other under the heading "drugs." It is simply stated that the number of samples reported upon (398) is still much smaller than is, in the opinion of the Board, desirable, and that the percentage of adulteration (15·0) continues very large. That these points, however, might have an important bearing upon the results is at least suggested by some figures that appear in the tabular abstract of reports found in the appendix. For instance, it appears that of 107 samples of "drugs" analysed in the metropolitan district, only 8 were reported to be adulterated. In the county of Lincoln 37 samples of drugs were examined and all reported genuine; and in Lancaster, too, of 47 samples none were reported adulterated; but in the neighbouring county of Durham, out of 51 samples 22 were reported adulterated, or more than one-third of the total number of samples of drugs reported upon adversely throughout England and Wales. Can it be pretended, therefore, that these figures represent even approximately the relative degrees of purity in drugs which obtain in the districts mentioned? Indeed, the Board itself admits a doubt whether the relative prevalence of adulteration is accurately represented by the figures given, the doubt being induced by the fact that in the case of milk the limit of an area in which an adulterated article is supplied appears frequently to be coincident with the boundary of the sanitary district.

With respect to the samples purchased privately and submitted to the public analyst, it is stated that a much larger proportion of them were reported to be adulterated than of those obtained by officers of local authorities. This is what might be expected, as a private individual would not be likely to incur the cost and trouble involved if he were not fairly confident that the article sold to him is not genuine. In order to encourage a greater development of the Act in this direction the authorities in Bristol, Salford and some other boroughs have made arrangements with the analyst to analyse samples for the public at 2*s.* 6*d.* each, instead of the half-guinea fee mentioned in the Act. It will be evident, however, that any movement in this direction will require to be made with discretion.

THE NORTH BRITISH BRANCH.

On Wednesday evening next, November 8, the North British Branch of the Pharmaceutical Society will commence a new session. The President of the Branch, Mr. Alexander Napier, will open the proceedings with an Address, and this will be followed by the reading of a "Note on the Solubility of Morphia Salts," by Mr. D. B. Dott.

THE CHEMISTS' BALL.

On Monday evening next, November 6, at 9 o'clock, a meeting will be held at 17, Bloomsbury Square, for the purpose of making the preliminary arrangements for the usual Chemists' Ball. Gentlemen who are desirous of becoming Stewards, but who will be unable to attend the meeting, are requested to communicate with the Honorary Secretary, Mr. J. F. Savory, 143, New Bond Street, W.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association will be held at 32a, George Street, Hanover Square, on Wednesday evening next, November 8, when a paper on "Subnitrate of Bismuth" will be read by Mr. F. H. Alcock.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 1, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, W. Hills, Radley, Richardson, Robbins, Savage, Schacht, P. W. Squire, Symes, Williams, Woolley and Young.

The minutes of the last meeting were read and confirmed.

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

Fletcher, James Edward.
Foden, Edwin.
MacDermott, Robert John.
Parker, William Henry.
Roper, Robert Francis.
Rouw, Theodore John.
Steel, Alexander.
Thornley, Frederick.
Wakefield, John.
Wright, Robert.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Roper, Robert Francis.....London.
Steel, Alexander .....London.
Wakefield, John .....Birmingham.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Dye, Charles Page .....Bury St. Edmunds.
Fawssett, Theodore .....London.
Heynes, Thomas Edward .....Maidenhead.
Hudson, Tom .....Wells.
Prothero, George Rees .....Pontypridd.
Rees, Rice William .....Swansea.
Robertson, John .....Aberdeen.
Salmon, Ernest Frederick .....London.
Surman, Thomas William .....Bristol.
Treharne, Frederick Gwilym...Weston-super-Mare.
Yates, George Albert .....Manchester.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Axford, Sidney Bertram.....London.
Hatfield, George William .....London.
Richards, John William .....Pontypridd.
Thiele, Johann F.....London.
Wright, Charles Rowland .....Portsmouth.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Mr. William Broom was appointed Local Secretary and Superintendent of Written Examinations for Exeter, in the room of Mr. George Delves, who has resigned.

ADDITION TO THE REGISTER.

The Registrar reported that—

John Mitchell Humble, Marsh House, Rothwell, near Leeds,

having made the statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by a duly qualified practitioner, his name had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report and recommendations of this Committee were received and adopted, and several accounts were ordered to be paid.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Librarian's Report.

The report of the Librarian had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
July	Day	429	24	6	16
	Evening	108	10	1	5
August	Day	113	9	0	4

Circulation of books.	No. of Entries. Town.	Country.	Total.
July	155	98	253
August	51	54	105

Carriage paid	£	s.	d.
July	2	5	4
August	1	5	11
September	0	10	0

The Librarian had also reported that in making the annual inspection of the Library, he had found that the undermentioned book was missing:—

Glasgow University Calendar, 1881.

The number of volumes and pamphlets in the Library on September 30, was 8513.

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Liverpool Chemists' Association, Reports, 1852-81. From the ASSOCIATION.

Flückiger (F. A.), Pharmakognosie des Pflanzenreiches, 2e Aufl., 2e Lief., 1882. From the AUTHOR.

Dragendorff (G.), Beiträge zur gerichtlichen Chemie, 1882.

Sitzungsberichte der Dorpater-Naturforscher Gesellschaft, 1882. Separat-Abzug. From Professor DRAGENDORFF.

Thompson (E. S.), Oration delivered before the Medical Society of London, 1882. From the AUTHOR.

Kinch (E.), The soy bean. From the AUTHOR.

Guermonprez (Fr.), Doigtier metallique pour le traitement des plaies des doigts.

— Notes cliniques sur quelques plaies des doigts, 1881.

— Simulation des douleurs d'origine traumatique, 1881.

— Revue de zoologie médicale, 1881.

— Étude sur les indications thérapeutiques dans le traitement des ascarides lombricoïdes, 1882. From the AUTHOR.

Smithsonian Institution, List of foreign correspondents, 1882. From the INSTITUTION.

Tommasi (D.) & G. Pellizzari, Action du temps sur l'hydrate ferrique. From Dr. TOMMASI.

Tommasi (D.), Réduction du bromure d'argent par la lumière.

— Action de l'aluminium sur le chlorure cuivrique.

— Sur un nouvel appareil destiné à montrer la dissociation des sels ammoniacaux.

Tommasi (D.), Electrolyse de l'eau, 1881.
— Appareil différentiel pour le dosage de l'ozone dans l'air.
— Sur l'électrolyse de l'eau distillée.
— Sur l'électrolyse.
— Sur le travail chimique produit par la pile. Two pamphlets.
— De l'influence de l'électrode positive de la pile sur son travail chimique.
— Réponse à M. Berthelot sur la force électromotrice d'un couple zinc-charbon.
— Relations numériques entre les données thermiques.
— Sur la loi des constantes thermiques de substitution. From the AUTHOR.
Hamberg (N. P.), Aix les Bains och några andra kurorter i Savojen, 1882. From the AUTHOR.
Gille (N.), Onguent égyptiac, 1882. From the AUTHOR.

The Committee recommended the purchase of the undermentioned books:—

Pharmacopœa Germanica, editio altera, 1882. 2 *copies.*
Christy (T.), New Commercial Plants and Drugs, parts 1–6. To be continued.
Smith (J.), Dictionary of Popular Names of Economic Plants, 1882.
Taylor (E. B.), Anthropology, 1881.

The Librarian had presented his report on the fifth annual meeting of the Library Association of the United Kingdom, held in Cambridge, September 5 to 8.

Curator's Report.

The Curator had reported the average attendance in the Museum to have been—

Attendance.		Total.	Highest.	Lowest.	Average.
July . .	Morning	276	27	0	10
	Evening	57	6	0	3

August—Total attendance during the first four days, 14 in the morning and 2 in the evening.

The following donations to the Museum had been received and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of the flowers of *Inula britannica* and *Artemisia judaica*; the root of *Camphorosma monspeliaca*; a fragrant oil from Colombo (*Lavandula sp?*); new Copal from Calcutta; bark of *Cinchona pubescens*; an original bundle of white Ipecacuanha; crystals of Tincal; Vegetable Tallow Seeds and the fat obtained from them, from Singapore; and Mauritius Anime. From Mons. C. CHANTRE.
Herbarium specimen of the Japanese Peppermint Plant. From Messrs. T. CHRISTY and Co.
Herbarium specimens of the Damiana plants, *Turnera aphrodisiaca* and *T. diffusa*; specimens of Juglandin (*Juglans cinerea*); Euonymin from the root and stem bark respectively; Irisin (*Iris versicolor*); Baptisin; Leptandrin; Barosmin (from root bark of *B. crenulata*); Pepsin in scales; Desiccated Oxgall. From Messrs. PARKE, DAVIS and Co.
Specimen of the volatile oil of *Eucalyptus dumosa.* From Messrs. HEARON, SQUIRE and FRANCIS.
Specimens of the Dyak Arrow Poison of Borneo. From Mr. R. JAMIE, of Singapore.
Specimen of the root of *Camphorosma monspeliaca.* From Mr. H. COCKSEDGE.
Specimen of the original deposit of crystals of Terpin Hydrate and selected crystals of the same. From Mr. W. ADAMS, Shrewsbury.
Specimens of Terpin Hydrate, with crystals and wooden models illustrating their crystallography. From Mr. R. H. PARKER.
Fine specimen of Cuprea bark. From Messrs. BURGOYNE, BURBIDGES, CYRIAX and FARRIES.

That the following specimens for distribution to provincial associations, etc., had been purchased:—Adulterated Saffron, Japanese Star-anise, Bengal Cardamoms.

Professors Bentley and Attfield had attended the Committee and reported satisfactorily as to their respective classes.

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

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grant:—

£10 to the widow of a registered chemist and druggist.

One application had been deferred until the next meeting, and another case the Committee had declined to entertain.

It was also recommended that the list of contributors to the Benevolent Fund be published in the *Pharmaceutical Journal* in January, and that a copy of that number be sent to each chemist and druggist on the Register.

The Council went into committee to discuss some of the details of the above report.

On resuming, the report and recommendations, with the exception of the case which the Committee had declined to entertain, were adopted. The case alluded to was referred back for further inquiries.

Mr. ROBBINS suggested that the Committee should be instructed to take into consideration the appropriation of the interest on certain gas shares which he had given in January last, on condition that the proceeds be given to such annuitant as had in former years contributed most to the Fund. He said he had intended to provide for a yearly sum of £5, but in the present year he found the interest amounted to £6 15*s.* 2*d.*, leaving a reserve of £1 15*s.* 2*d.* for any future deficiency.

Mr. RICHARDSON accordingly moved a resolution that the Committee take this matter into consideration, which was carried unanimously.

GENERAL PURPOSES.

The report of this Committee included the usual report from the Solicitor as to cases which had been placed in his hands. It stated that Mr. J. F. Craig, of Blackfriars Street, Manchester, who had been proceeded against for a breach of the Pharmacy Act, had paid the penalty and costs without action.

Several other cases of alleged infringement of the Act had been considered by the Committee, and in the majority of them it was recommended that proceedings be commenced.

The Council, as usual, went into committee to consider the above report.

On resuming, the report and recommendations were received and adopted.

REPORT OF EXAMINATIONS.

October, 1882.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	8	2	6
,, (19th)	6	2	4
,, (25th)	7	5	2
	— 21	— 9	—12
Minor (18th)	17	5	12
,, (19th)	20	8	12
,, (25th)	21	5	16
,, (26th)	24	11	13
	—82	—29	—53
Modified (18th) . . .	3	1	2
	—	—	—
	106	39	67

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	1	1	0
Minor (18th)	12	5	7
„ (19th)	13	5	8
	—25	—10	—15
	—	—	—
	26	11	15

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
October 4th	248	131	117

Fourteen certificates were received in lieu of the Society's examination:—

3 College of Preceptors.
1 Incorporated Law Society.
6 University of Cambridge.
3 „ Oxford.
1 „ Edinburgh.

SPURIOUS AND WORTHLESS DRUGS.

Mr. WILLIAMS said there was a matter which he wished to bring before the Council with reference to the public sale in London of spurious and worthless drugs. Not long ago it was brought to his attention that upwards of a ton and a half of ipecacuanha was offered for sale, which, on examination was obviously worthless and rotten, but which still found a purchaser at a comparatively high price. This was not by any means the only case. He would pass round a sample of jalap, which no doubt was genuine jalap at one time, and he had endeavoured to ascertain its history. It appeared that this had been imported from Paris, where the jalapin had all been extracted from it; it had then been dried and sent to this market again, where it found purchasers as jalap. Several wholesale druggists had drawn attention not only to these cases but others; in one case there was some balsam of tolu, which contained 40 per cent. of resin, and such things he had been informed occurred at nearly every drug sale. In America, the government appointed inspectors of drugs, and prohibited the importation of any drugs unless they came up to certain standards. Now such a measure as that would, he feared, be very injurious to a market like the London market; nearly all the drugs in the world came either to England or to Hamburg, and he feared if anything like the American system were established, a great many drugs which were useful would leave this market and go to another. At the same time it was considered by many in the wholesale trade that there ought to be a power to destroy absolutely spurious and injurious drugs, in the same way as spurious tea or unwholesome fish or meat were destroyed. Some of the wholesale druggists thought the Society might assist very materially by going to the Government on public grounds, and asking for the establishment of a system under which inspection should be enforced under certain conditions, and that there should be a power to prohibit the sale of or to destroy these spurious things. What he would like to know was whether if he brought forward a series of cases of the kind he had described, properly authenticated, the Council would be inclined to join with the wholesale trade in making a representation to the Government on the subject, and so proving that it took interest in the welfare of the general public. There might be a good deal to be said on the other side of the question with regard to the restrictions on trade, and so on, but he hoped the Society would encourage the wholesale druggists by promising to support and assist them in obtaining a healthier state of things.

Mr. HAMPSON said the Council was indebted to Mr. Williams for bringing the question forward, but he thought it would be well if a committee were appointed to consider it before any steps were taken. It was a delicate question and would require very careful management or they might find more Government interference than they liked. The aim should be to remedy the grievance without establishing another.

Mr. SYMES suggested that one of the existing committees might deal with the question.

The PRESIDENT thought perhaps the best plan would be to let the Library, Museum and Laboratory Committee appoint a sub-committee at its next meeting. He thought it would have a good moral effect if a paper dealing with several of these cases, properly authenticated, were read at an Evening Meeting to call attention to the subject.

Mr. WILLIAMS said there was an Adulteration Act which affected the retail trade, but it would not in any way affect these wholesale dealings, so the most worthless articles could be sold openly and publicly without any possibility of touching the sellers under the Adulteration Act. At the same time it would be very unfortunate for any interference to take place with the legitimate wholesale trade; what was wanted was to find some happy medium by which the public could be protected from the fraud which now occurred without restricting the liberty of trade. He thought that any committee which was appointed would be glad of the advice and opinion of the Council.

Mr. WOOLLEY suggested that some good might be done by the publication of Mr. Williams's remarks.

Mr. SAVAGE said this was an interesting subject to the whole of the chemists in England, and it was very important that they should be made acquainted with the facts. If it were generally known it would show the public the importance of going to respectable shops for their drugs.

Mr. WILLIAMS said he would move that the question be referred to the Law and Parliamentary Committee with power to confer with certain members of the wholesale trade as to what steps should be taken, if any, with regard to the sale of spurious drugs.

Mr. RICHARDSON thought it would be better to have a special committee. He was not on the Parliamentary Committee and should be very glad to take part in this inquiry.

Mr. SYMES said the Law and Parliamentary Committee would have power to call in the aid of the wholesale trade.

Mr. WILLIAMS said it would be easy to add Mr. Richardson's name to the Law and Parliamentary Committee.

Mr. GREENISH remarked that scarcely an Evening Meeting took place at that house, at which instances of adulterated drugs were not brought forward. He did not think Mr. Holmes ever explained the specimens he had on the table without one or two being shown as adulterated specimens. The subject was not new, but it might perhaps be brought forward with more force than had hitherto been the case.

The VICE-PRESIDENT said it would have more effect if a paper were prepared on the subject. He should be very glad if Mr. Williams would prepare one. He thought it would be well to appoint a special committee with power to add to its number so that it might bring in two or three wholesale druggists from outside.

Mr. RICHARDSON agreed with Mr. Greenish that these matters were not new; they had been spoken of over and over again for years, but he was afraid that the sinners in the city took not the slightest notice of these exposures. The better plan would be to have a committee from the Council to co-operate with some of the wholesale people, and see if anything could be done. It was known to all wholesale dealers that this had been going on for years, and it was impossible to stop it unless Government aid were invoked. As a wholesale druggist he was rejoiced to think something was going to be done to put a stop to this pernicious practice, for it was very hard on those who wished to be honest that so many facilities were given to malpractice.

Mr. Robbins said, some years ago it was the practice of the Editor of the Journal to bring before the notice of his readers any adulterated article which came on the market, but he did not think those in the trade had any idea of what was going on until their attention was directed to it in this way. It was only necessary for the chemist to know that adulteration was being practised on any article and then he would take proper precautions, and that article would soon be expelled from the market. He recollected several instances of that kind. On one occasion a quantity of spurious senna leaves were offered for sale, but the fact was noticed, the mode of detection pointed out and the thing soon came to an end. Thus the evil cured itself when it was properly brought before the members, and he believed if the same thing were done now, a full description being given of the adulteration and mode of detection, it would put a stop to it.

Mr. Schacht said he was not certain that he saw the practical outcome of this proposed action. It occurred to him that as a body of pharmacists it was undoubtedly within their province to ascertain the facts connected with the adulteration of drugs, and to make those facts as widely known as possible, but he was not quite sure that in the action which seemed to be proposed the Council would not be going a little outside its legitimate work. Supposing this evil to exist to a very large extent, what was to be the process by which it was to be eradicated? How could the root of the evil be reached. First of all by a process which would go to the examination of all drugs, certifying what was good and what was imperfect, and, secondly, by punishing those offenders who were detected; but the task in each case would be an exceedingly difficult one. Supposing either of these things were accomplished, there would be the risk of absolving the wholesale dealers who purchased and distributed the drugs from their legitimate duty, viz., of satisfying themselves that the materials they had bought and sold were good. With regard to these articles he found by experience that he could place more trust in some men than he could in others; he knew that he had a personal duty to perform after them, but he felt it more incumbent on him when materials came from certain sources to perform that duty, than when they came from other sources. He was rather disposed to think that in order to remedy this evil, the Council must be content with exposing it, and he should be rather sorry if it were understood that the committee to be appointed should co-operate with gentlemen outside the body for a purpose which lay, in his opinion, a little beyond the proper province of the Society. He was very much inclined to think that the sole duty of the Council consisted in teaching the processes by which good things could be recognized from bad, and in exposing as much as possible attempts to palm off fraudulent articles. Those powers it already possessed, and he should be disposed to endorse all the recommendations of Mr. Williams. He hoped he would put his knowledge in the form of a communication to the Society, and let it be made public.

Mr. Williams said it was not a question of adulteration altogether. Every druggist in the market could tell that the specimen before the Council was bad jalap; it was an evident case of fraud.

Mr. Symes thoroughly approved of the suggestion that a committee should be appointed, because it would be only carrying out one of the very objects for which the Society was instituted, viz., the protection of those carrying on the business of chemists and druggists. Wherever the Society found a useful purpose could be served by exercising that power it should do so; complaints were often heard that it did not exercise that power and look after the interests of chemists and druggists, and this was one particular in which it might very well do so. A good deal had been said about discriminating between drugs, and there was no difficulty whatever in discriminating between this exhausted jalap and the rotten ipecacuanha as they were now shown, but when they came to be ground up and mixed with a little of the good article a great deal more difficulty would arise. These things were not like chemicals, which could be tested and determined at once whether they were good or bad, or merely of second quality. Mr. Schacht's argument would scarcely go the length of rejecting the motion, because the committee would not take any responsibility of action without reporting to the Council, even if it recommended any action at all. He took it, too, that there would still be a good deal of discretion left with the wholesale houses in declaring the various qualities of drugs; it was only suggested that, if the committee thought it desirable, someone should be appointed to destroy the really worthless articles, and that, it appeared to him, would be a step in the right direction. It would convince the Government and the public generally that the Society was exercising the powers it possessed for the public good.

Mr. Greenish agreed in the main with the observations of Mr. Schacht. He thought the publication of the facts at an Evening Meeting and in the Journal would be amply sufficient, and did not see what benefit could result from a committee. He might mention a case which occurred about twelve months ago, when a large quantity of rose leaves artificially coloured was put upon the market. Some came under his notice and he requested his son to examine them, which he did, and read a paper before one of the Evening Meetings, in which he showed that these leaves were coloured with magenta. The bubble burst at once, and he was told by the principal of one wholesale house that he had disposed of a large quantity of these leaves for sachets or something of that sort—they were taken out of the domain of medicine.

Mr. Andrews supported the proposal for a committee, because, notwithstanding there had been these exposures at Evening Meetings and in the Journal, the evil still went on, showing that the reading of papers alone was not sufficient. He thought with the careful limitations, which no doubt would be introduced, there would be no danger to the trade to be feared.

Mr. Savage said one thing occurred to him which he thought would meet the difficulty without going into that minute detail which would require the objectionable practice of having an inspector visiting chemists' shops and examining the drugs, which was once the case, and led to a great deal of abuse,—there might be an inspector to examine the imports and exports so as to avoid adulterated goods coming in. There was already an Act condemning those adulterated drugs found on the premises of any chemist, and if drugs which were manifestly impure could be kept out of the market it would meet the case.

Mr. Bottle agreed with the remarks of Mr. Savage. If there could be an inspector who should inspect and destroy all those drugs which were absolutely useless, in the same way as the inspector of meat or fish at Smithfield or Billingsgate, it would meet the case. Those inspectors did not destroy that which was of inferior quality, but only that which was absolutely deleterious. But he rather viewed this specimen of jalap from a different point of view, for it seemed to him that the Sale of Food and Drugs Act was quite sufficient to meet such a case. He believed that those individuals who sold such an article would be liable to the penalties of the Act.

Mr. Gostling said it was most important that chemists should be able to procure good drugs in a powdered state; at the same time he was very much afraid of Government interference. Not that he should object to an inspector coming to look at his stock, or that of any gentleman round the table; but it appeared to him that the remark of Mr. Greenish met the case entirely, especially if a person like the Curator were appointed to go into the drug market and ascertain the condition of things, which was presented and periodically reported to the Council.

The PRESIDENT said that was done at the present time.

Mr. GOSTLING said the result was not made public. If printed reports were presented from time to time people's eyes would be opened.

Mr. WOOLLEY said that through this subject coming forward so suddenly he had hardly made up his mind what was best to be done; but he understood from Mr. Williams that certain gentlemen connected with the wholesale drug trade wished the Society to take the matter up.

Mr. WILLIAMS said that was so.

Mr. WOOLLEY said with that view he should strongly support the appointment of a committee, if it were only to meet those gentlemen and show them that the Council was willing to see what grievance there was and help to remedy it if possible.

Mr. RICHARDSON said it was the duty of the Council to protect the chemist as far as it could, even against the malpractices of wholesale druggists.

The VICE-PRESIDENT said Mr. Richardson had expressed what he was about to say. He was as jealous as any man well could be of Government interference, but it struck him that the appointment of an inspector would only refer to the importation, not to go into provincial pharmacies. His duty would be to do as was done in the case of tea, to condemn on the spot that which was adulterated or exhausted. He did not know whether all wholesale houses kept their own analysts, but it would be an immense advantage to have the thing stopped before the article came into their possession.

Mr. SQUIRE thought that everyone who had passed the Minor examination could detect the absolutely worthless character of the two specimens of ipecacuanha and jalap which had been referred to.

Mr. GREENISH (handing up the sample of jalap) said it was absurd to suppose that any wholesale dealer required anything to protect him from the purchase of such an article as that.

Mr. HILLS thought very likely the committee would be able to collect useful information, but he was not satisfied at present that it would be able to do anything further. He did not think the cases of the fish and meat inspectors were altogether parallel, because in the case of drugs he presumed there were instances in which a sample would be quite useless for one purpose and yet might be useful for another. There might be certain drugs which were not entirely deprived of their active ingredients and yet not suitable to sell in the condition in which they were, but which might be useful for manufacturing purposes, and there would probably be a large number with regard to which it would be difficult to decide whether they had any value or not. After all it was a matter of price, and as a rule if the chemist would pay a fair price he would get very good powdered jalap or ipecacuanha, but if he chose the lowest priced articles he must expect to get something inferior.

Mr. CHURCHILL said that both from the wholesale and retail point of view it was a great hardship that the honest man should be undersold by one who was content to buy such stuff as that produced. He should not like to give an opinion offhand whether an inspector should be appointed or not, but he thought no harm could be done by appointing a committee which in the first place would endeavour to ascertain how much of this sort of thing actually took place.

Mr. SCHACHT said if the committee came to the conclusion that it was desirable to appoint an inspector, the question should also be considered whether the inspector's duties should take him into the wholesale druggist's warehouse as well as the open market.

Mr. WILLIAMS then moved formally:—

"That a committee be appointed to consider the question of the sale by auction of spurious and worthless drugs and to report to the Council what steps, if any, should be taken to check this practice. That the Committee consist of the President, Vice-President, Messrs. Greenish, Hampson, Richardson, Symes, Williams, Woolley and Young, with power to add to their number."

In reply to some of the remarks which had been made he should like to say that he trusted the committee would not go to work with any foregone conclusion that no action was to be taken. It would hardly be fair to call on their wholesale brethren to come and give time and attention to the Committee if such were the case. He had approached this question with great caution and did not wish to commit the Council in any way. He saw the difficulties, as clearly as Mr. Schacht did, of anything like legislative action or grandmotherly care; all he wished to urge was that when a case of exhausted or spurious or spoilt drugs or something not fit for human consumption was pointed out there should be power somewhere to prevent that thing being sold. Several gentlemen had observed that druggists both in town and country were generally quite able to distinguish a good article from a bad; but this ipecacuanha when scrubbed up, washed, dried and powdered would go out as *pulvis ipecac.*, and it would be more difficult for many persons to distinguish it. It was very well known who purchased these things; the buyers were as well known as the sellers, and it had lately led to a scandal in the market. Those who did not buy such things challenged those who did and asked, "How can you buy such rubbish?" But the answer had always been that they sent it abroad and that they did not sell it in England. There seemed to be a sale somewhere for all the rubbish that could be collected in the London market. Mr. Greenish seemed to think that exposure was sufficient and gave the illustration of rose-leaves coloured with magenta. He would be somewhat surprised to hear, perhaps, that these leaves were still in the market and were purchased in large quantities, so that exposure had done no good whatever in destroying these improper practices. Under these circumstances he thought he might fairly ask the Council to appoint a committee with the serious intention of supporting the action of the wholesale drug trade in applying to the Government to do something to check the importation and sale of absolutely spurious or rotten drugs; not in any way to prevent the importation of any quality of drugs if genuine, because the lower qualities were often very useful for manufacturing purposes.

Mr. SYMES seconded the motion.

The PRESIDENT said the gist of the whole matter was that the attention of the Council had been called, not for the first time, to the sale of those things by auction; and it was notorious that any person, whether a druggist or not, could go and see the attempt made to sell by public auction materials absolutely worthless. It was a cruel form of deception, and as that was the only Society representing the intelligence of the drug trade, it was only fair that it should be asked to consider if anything could be done to check such practices. The best pharmacists in the world, those in the United States, had come to the conclusion that it was necessary to have an inspector, though no one would suppose that the average pharmacist in the United States was not an educated man, and, as far as the analytical processes would allow, able to protect himself. The Committee would consider the matter with the greatest care before making its report to the Council.

The motion was then put and carried unanimously.

THE LATE MR. ALLCHIN.

The VICE-PRESIDENT said a telegram had been received that morning stating that Mr. Allchin had died at half-past nine o'clock, and he felt that no time ought to be lost in referring to this painful event. He could not claim such a long and intimate knowledge of Mr. Allchin as some of the members of the Council, but he had known him some years and very highly esteemed him. It was needless to dwell on his genial qualities as a man, but he

had also occupied a prominent position in connection with the Society, sufficient to justify the Council in taking marked notice of his decease. He was one of the earlier Major certificated men, he believed he was once demonstrator in the school and certainly had been for some years one of the examiners. Since he had had the honour of being Vice-President he had been brought into close contact with him and had learned to esteem him very highly. He therefore begged leave to move—

"That this Council learns, with much regret, the death of Mr. Allchin, and that the President be requested to write a letter of condolence to Mrs. Allchin expressing the sympathy of the Council with her and the members of her family."

Mr. Bottle seconded the motion. He said the Vice-President had left nothing to add other than this, that it was his privilege to have known Mr. Allchin for a great many years, he could scarcely say how long, but from a very early date in the formation of the Society he had know him as an active worker. Mr. Allchin was at all times a genial and pleasant companion, and he deplored his loss very much.

Mr. Savage could not allow the opportunity to pass without expressing his deep sympathy with the family of Mr. Allchin. He had probably known him longer than any member of the Council, for he knew him when he was an apprentice at Brighton. He, therefore, did sincerely sympathize with the widow and family of Mr. Allchin, and regretted deeply the loss the Society had sustained.

Mr. Williams said Mr. Allchin was an old friend of his, he having known him when he was a student in the school. He saw him last at the Conference, at Southampton, when he felt doubtful whether he should see him again. He was deeply grieved to hear of the death of his old friend, who was one of the most able pharmacists he had known.

Mr. Andrews said it was hardly necessary to multiply testimonies of respect to Mr. Allchin, but he had known him a very long time and was very intimately acquainted with him. After the meeting at Southampton he had spent a few days with him in the neighbourhood of the New Forest, and was then painfully convinced that he was not long for this world. He could only say he had never known a more amiable or more lovable man.

Mr. Greenish wished also to express his regret at the death of Mr. Allchin, and his sympathy with his family. He had known Mr. Allchin for very many years, he could scarcely say how long. He esteemed him as a friend, and had a high opinion of his abilities as a chemist and pharmacist. His death would be a great loss to the Board of Examiners.

The President, in putting the motion, said he fully endorsed every word which had been said of Mr. Allchin. He had known him for many years, and, having worked side by side with him as an examiner, could testify to the extreme value of his services on that Board.

The motion was carried unanimously.

EVENING MEETING.

Wednesday, November 1, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held on Wednesday evening last. The chair was taken at half-past eight by the President.

The minutes of the previous meeting were read and confirmed.

The President commenced the proceedings by reading a paper on—

The Orchard Alum Spring.

BY DR. THRESH.

The paper is printed on p. 361, and gave rise to the following discussion:—

Mr. Postans said the meeting was greatly indebted to Dr. Thresh for presenting such an interesting and able paper, in which he had given a most excellent analysis of the water from this spring. He said he was informed, though he did not give any medical testimony, that it was an excellent vermifuge, and he need not say that anyone who would bring to light a British spring which possessed all the properties which Dr. Thresh ascribed to this had really conferred a great boon on the medical profession. All that was necessary to bring it into use was that medical testimony to its efficacy should be forthcoming. Germany had long maintained a high reputation for its waters; it might be that there were plenty of most useful springs in our own country if they were only known.

Mr. Ekin said that springs having a blood-red appearance were not uncommon in coal districts. He had himself examined an iron spring of some considerable volume, issuing from a coal mine, which contained about 60 grains per gallon of iron as ferrous sulphate. He was considerably startled at what seemed to him the enormous quantity, but on referring to one of the reports of the Rivers Pollution Commissioners he found that they had examined several springs of the same kind. One feature of this spring was the large amount of sulphate of alumina. No doubt there were many springs in England containing large amounts of iron and alumina. Bunsen's method of analysis, by which the table at the end of the paper was arrived at, had an immense superiority over the older methods, as the change of condition brought about by evaporation was avoided. At the same time he was a little struck at the boldness of Dr. Thresh in the matrimonial way; he thought a more timid man would have hesitated a little before he brought out his figures as he had done. For instance, to say that in the case of the chloride of ammonium, which was present in the water to the extent only of ·125 grain per gallon, to say that the ammonium was necessarily combined with the chlorine was taking a good deal for granted. And again, in the case of the ·170 grain of nitrate of potassium, it was of course just as likely that the nitric acid was in combination with the calcium as with the potassium. He must confess to having a preference for giving the bases and acids separately; all this fitting in was very nice, but anyone who had any experience of analysis of this sort must know that there must be a certain amount of straining to make things fit so completely. He thought that the plan of giving the bases and acids separately was the more scientific and proper way.

Mr. Williams said he noticed in the table at the end $BaSO_4$ were said to be found in enormous quantities, but he apprehended this must be a printer's error, as there was nothing in the former table to show this quantity of barium.

The President said Dr. Thresh gave this table to show the correctness of his original analysis, and in it he gave, according to Bunsen's method, the results of the various constituents he got in the portion of the residue soluble in water, the portion insoluble in water, and the total. So in determining the sulphuric acid, he had so much barium sulphate, etc. In a footnote Dr. Thresh referred to the *Journal of the Chemical Society*, which contained a paper he had read, probably the best paper published for many years on the analysis of mineral waters. He believed it was due to Dr. Thresh's modesty that he had not lengthened this paper and given fuller details. In that paper he showed conclusively the advantages of Bunsen's method, which consisted in determining the constituents of the soluble portion, the insoluble, and the total, giving the results, and leaving those who had to judge to draw their own conclusions. There was in the present paper a supplemental table to enable those interested in the subject to check his results. He had had some opportunities of seeing springs in the Lancashire and Yorkshire coal districts, and had there seen water which would probably give something like these results. He had seen some of a deep blue-red colour

indicating a large quantity of ferric sulphate, but these waters had not been analysed in any large number, except those referred to by Mr. Ekin, which had been dealt with by the Rivers Pollution Commission. It was well known that these iron springs had some effect on organic matter, and if anyone present had any experience in rural districts and could speak as to the effects which salts of iron were supposed to have in purifying water from organic matter he should be glad to hear the result. Very extraordinary results were said to have been obtained not only by adding ferrous sulphate to water, but also by passing water through a spongy iron filter, and so on.

Mr. Schacht said if Dr. Thresh had been present he should have liked to have asked him if he had any further grounds for the assumption contained in one paragraph, where he said it was singular that when carefully evaporating, the basic salt redissolved, yielding a residue which could be diluted, and formed a nearly colourless solution. He should like to know if that was the only justification for the statement that the acidulous and basylous radicals in the latter case would scarcely be in the same state of combination as in the original water. If so, there might be some reason in his mind that did not appear for his exact distribution of the elements in their combinations to which Mr. Ekin had taken some exception.

Mr. Ekin said that in a case, not long ago, in which he was consulted, an action was brought against a local board in Staffordshire, which poured the whole of its sewage into a river, and it was proved that the water from a disused coal mine containing a large amount of iron as ferrous sulphate had mixed with this river, and in the course of a very short run the sewage was destroyed. The case for the prosecution, which was conducted by the riparian owners, was based largely on the fact that the stones and banks for some mile or two down the river were coloured with a nasty yellow deposit; but that was proved to be simply ochre, and the local board won their case completely. He believed that within the last two or three months Dr. Thresh had discovered another spring in the neighbourhood of Buxton, which he was utilizing for this purpose, having been consulted by the local board there in their sewage difficulty. He was still experimenting in that direction, and he believed the local board of Buxton would probably be indebted to him for getting them out of the difficulty with the least possible cost and trouble.

Mr. Allen said it might not be generally known, but travellers on the Great Western Railway into the Cornish district were not unfrequently astonished to see large streams of blood-red water running down through the valleys, and of course full of impurity. This blood-red colour was no doubt due to a considerable quantity of iron impurities washed out from the tin stones, and he had also noticed the yellow deposit which Mr. Ekin had spoken of on the border of the streams, which he had always thought to be an oxide of iron. If any gentleman in the Society wished to analyse any of this water he would undertake to procure a quantity of it, but whether it represented thousands of gallons of disinfectant running into the sea, he was not prepared to say.

The President said with regard to the first criticism, as to the bold way in which Dr. Thresh had tabulated his results, he was quite sure if he had been present he would have been only too happy to have given the results on the basis of the investigation which he published in April last in the *Journal of the Chemical Society*; but practically that would not have given to a large number of members the kind of information which they wished. He had given the results in the old-fashioned and popular way. Everyone knew that pairing was a difficult process in all affairs of life, and not the least so in analysis. It was very difficult indeed to give a table of this sort and put the acidulous and basylous radicals in a satisfactory way. His own impression was that Dr. Thresh had given the very best practical result he could on the total results as mentioned in the last table. He concluded by proposing a vote of thanks to Dr. Thresh, which was carried unanimously.

The President then read a—

Note upon the Use of Oxalic Acid as a Test for Arseniates in Alkaline Salts.

BY C. PATROUILLARD.

The paper is printed on p. 362, and gave rise to the following discussion:—

The President said this paper, by a distinguished pharmacien and chemist, was a rejoinder to the excellent paper read by Messrs. Naylor and Braithwaite at the Conference, in which they had repeated the experiments of M. Patrouillard, using arsenic oxide and water instead of alkaline arseniates, and had not obtained the results by him described. If either of those gentlemen had any remarks to make he was sure the meeting would be pleased to hear them.

Mr. Naylor said no one present could possibly feel greater satisfaction at receiving this paper from M. Patrouillard than Mr. Braithwaite and himself. He thought they might at least be congratulated on one important admission. He referred to the fact that oxalic acid did not act as a reducing agent on arsenic acid. But on referring to the original paper of M. Patrouillard it was perfectly evident that at the time the author wrote it he was of opinion that oxalic acid did exert a reducing action on arsenic acid, for he there stated, "Oxalic acid appears then to act on arsenic acid as well when it is combined as when it is in a free condition." He must say that it was quite unintentional on the part of himself and Mr. Braithwaite selecting arsenic acid mainly for experiments; although they had M. Patrouillard's instructions before them they certainly had no intention of deviating from them, and when they employed the acid instead of the salt they did it inadvertently. For his own part he was a little disappointed with this communication in one particular. It was a little unfortunate that M. Patrouillard should have confined himself to the use of a single reagent. When he had employed the oxalic acid or oxalate of ammonia he had not tested that solution to see if reduction had taken place or not, but had immediately employed a reagent which itself had a reducing action upon arsenical salts. With this sentence he could quite agree:—"When a *salt* contains at least 1 to 2 per cent. of an *arseniate*, if it be boiled with oxalic acid or oxalate of ammonia for a few minutes, sulphydrate of ammonia or sulphuretted hydrogen, after the addition of a few drops of pure sulphuric acid, will produce in it, at the end of an interval more or less long, a yellow precipitate of trisulphide of arsenic. This precipitate may be accompanied by a varying quantity of sulphur. If the proportion of arseniate contained in the salt amount to 5 or 10 per cent., and especially if the mixture be still sufficiently hot, the precipitate is produced *immediately*." He should not be at all surprised at this; in fact, if he were to take an alkaline arseniate and dissolve it in hot water and then acidify it with strong sulphuric acid and add a few drops of sulphydrate of ammonia he should expect to get down, not pure sulphur, but a precipitate consisting of tersulphide of arsenicum with a varying proportion of sulphur; how much he was not at present prepared to say, because the quantity would depend on certain conditions, notably temperature. M. Patrouillard said that he had noted in his laboratory register a large number of testings, and it was rather unfortunate he had not given in this paper the manner in which he obtained them. Although in the main he and Mr. Braithwaite had used arsenic acid in their experiments, they did not confine themselves entirely to it, and he found on looking back over his notes that in two or three cases disodic arseniate was employed. They did

not, however, exactly follow Patrouillard's directions, for having dissolved the arseniate and boiled from a quarter to half an hour with oxalic acid, they did not then pass sulphuretted hydrogen through it, but tested the solution as it was, expecting if a reduction had taken place to find it. There was a question in his mind as to the part which the sulphuretted hydrogen played in this reaction, and, as text-books varied very much in their statements with reference to the action of sulphuretted hydrogen on arsenic compounds, they had paid some attention to it, and they thought it would be only paying due respect to M. Patrouillard if they were to repeat his experiments and present the results at the next Evening Meeting. Meanwhile he wished it to be understood they still considered that oxalic acid not only had no reducing action on arsenic acid, but that *per se* it had no reducing action on alkaline arseniates.

The PRESIDENT asked if Mr. Naylor wished it to be understood that his last statement was the result of experiment.

Mr. NAYLOR said it was not the result of recorded experiments, but only of note-book experiments.

The PRESIDENT said it was very important to study carefully the action of reducing agents on these oxidized compounds of arsenicum, and anyone who had experience in the matter would confer a benefit on all engaged in analytical work if they would state them. He thought now it might be assumed that with regard to arsenic acid, Mr. Naylor and his colleague had made good their case, but with regard to the unrecorded experiments, they must wait until they had further information before giving any opinion. They were indebted to M. Patrouillard for his courtesy in sending this paper in answer to that of two Englishmen, and he was sure the meeting would accord him a hearty vote of thanks.

Professor REDWOOD thought it was due to Mr. Naylor to state that he, from his own experience, agreed with him as to the effect of using sulphuretted hydrogen or sulphydrate of ammonia as a precipitant where arsenic acid was concerned. All chemists were aware that sulphuretted hydrogen was not an accepted precipitant for arsenic acid, inasmuch as it did not in the first instance throw down arsenical sulphide, and an operator could not depend on the arsenic being precipitated from the solution by the mere use of sulphuretted hydrogen; but at the same time it was familiar to all who had any experience of the matter that if sulphuretted hydrogen were passed through solution of arsenic acid continuously for some time there would be ultimately a very appreciable precipitation. That appeared to be very much the view which Mr. Naylor was depending upon being able to justify by further experiments.

The PRESIDENT said the experience of Professor Redwood was no doubt that of those who had anything to do with this subject. Some years ago, when he had more to do with analytical chemistry than he had at present, he had many opportunities of proving the correctness of what had now been stated with reference to this reaction.

A vote of thanks to M. Patrouillard was passed unanimously.

The last paper read was a—

NOTE ON TINCTURA CAMPHORÆ COMPOSITA.

BY J. BLAND.

The paper is printed on p. 363, and gave rise to the following discussion:—

Mr. HOLMES said it gave him great pleasure to hear, at last, a paper on a pharmaceutical subject. With regard to star-anise, Mr. Bland had brought forward a very practical point in the fact that it is less soluble than ordinary oil of anise in proof spirit. In order to test this statement he had made two solutions, one of the oil *Pimpinella anisum*, and the other of the oil of *Illicium anisatum*, both of the strength of the tinct. camph. co. of the British Pharmacopœia, and it would be seen on comparing them that one was less soluble than the other, though the difference was not very great. In a former number of the Journal other features were pointed out by which the two oils could be distinguished; one was the congealing point, another the molecular rotation, another the fact that alcoholic hydrochloric acid would give with the true oil a reddish colour after a time, whereas the star-anise oil remained colourless. He should like to know if it were the fact that the oil of anise of commerce was almost entirely obtained from star-anise, as Mr. Bland supposed. The oil of anise became solid at a little above 50° F., whereas star-anise oil remained fluid down to nearly 35° F.; this difference could be easily observed in winter. With regard to the poisonous property of Japanese star-anise, a writer in the Journal had stated that the poisonous principle was soluble in water. He did not know whether it would in any way contaminate the oil, but if not, of course the oil would not be dangerous, even if Japanese star-anise fruits were mixed with ordinary star-anise. The Japanese star-anise fruit had lately come in large quantities into the market, but he had not been able to trace what became of it. He was somewhat surprised to find how rarely members of the Society made notes on points of interest which must inevitably crop up during their daily avocations. He thought, as a rule, such notes were of general interest, and would add much to the success of the Evening Meetings if brought forward more frequently.

Mr. GERRARD said he could corroborate what Mr. Bland had stated, but not as a rule; it had been rather an exception with him to find a separation of the oil of anise from tinct. camph. comp.

Professor REDWOOD congratulated the meeting upon having a truly pharmaceutical subject brought before it, and hoped they would more frequently have papers of this description. With reference to the subject itself, he should like to know a little more specifically than had been indicated the exact difference in solubility of the two oils, and whether the difference, looking at the quantity used in making the compound tincture of camphor, would be sufficient to account for the separation referred to by Mr. Bland. He believed it was generally admitted that a great part, if not the greater part, of the oil of aniseed which was commercial in this country was the oil of star-anise. Moreover, he had been for years accustomed to consider, having taken his opinion from such works as Dr. Pereira's, that the oil of star-anise was preferable to the other variety. Considering that those who had had experience in the use of these oils had given the preference to the oil of star-anise, and that on that account it was recognized in the B.P., considering that they had no evidence at the time, and he did not know what the evidence was now, of its having any poisonous effect, he should be rather disposed to think if any such effects had been observed they might be due to the fact of the oil being imported in copper vessels. At any rate he should like to know somewhat more definitely the grounds upon which such an accusation had been made against it. Considering, again, the preference given by high authorities to the oil of star-anise, and that it had a higher congealing point than the other oil, it was quite possible that a practice which had been detected in some instances was more common than they were aware of, namely, that of giving to the ordinary oil of anise a resemblance to the oil of star-anise by dissolving in it a small quantity of spermaceti. This substance had been detected in some specimens of oil of anise which had been sold as oil of star-anise; and seeing that spermaceti was not soluble in proof spirit, seeing, moreover, that some of those largely engaged in making this tincture had not experienced the difficulty Mr. Bland referred to, he thought it might be accounted for by a small amount of impurity in the oil employed.

Mr. ALLEN said there was one point to which Mr. Bland had not referred, viz., that a decrease of temperature, after the first solution had been made, would

have the effect of throwing the anise out of solution. He had never found any difficulty in making the tinct. camph. comp., nor had he found the oil insoluble which he happened to use; but he did prepare an essence of aniseed containing more oil of anise than the tinct. camph. comp., with a much smaller amount of spirit, and with that his experience was that during the summer months it was perfectly soluble, and could be filtered bright into the stock bottles; but when the winter came there was not exactly a deposit, but an appearance through the liquid of a most remarkable series of apparently irridescent crystals. It was perfectly evident in a case of that proportion, that the fall of temperature threw the oil of anise out of solution, though in the first place it was thoroughly dissolved and passed through a filter.

Mr. Holmes remarked that the vessels in which oil of anise was generally imported were, he believed, made of lead, and, therefore, it was not likely that the oil would be contaminated with copper. He was referring to that imported from China, and he was not sure whether the Japanese tree grew in that part of China where the *Illicium anisatum* grew; and, therefore, it was not at all likely that the imported oil would be poisonous, except that it had been shown by Mr. Eykman that the same poisonous principle was present in very small quantity in star anise itself. The fruit of the Japanese star-anise had been shown to contain a poisonous principle which was soluble in water, but he was not sure that there was any evidence of its being found in the oil. In the samples on the table there were 3 drops of oil to 2 ounces of proof spirit; he also made a third solution with 6 drops of *Pimpinella Anisum* to 2 ounces of proof spirit, and found that it left just as much insoluble matter, judging by the eye, as the 3 drops of oil of *Illicium anisatum* did, which would seem to indicate that the former was about twice as soluble.

Mr. Bland, in reply, said he had recently obtained some oil of *Pimpinella Anisum* which he had reason to believe was genuine, and which was quite soluble. The oil used in his former experiments, in which he failed to get a bright solution, was obtained from five or six different sources; and until he got this last specimen, which he was informed was distilled from Russian fruit, he had not for some years seen a specimen which was entirely soluble in the proportion of ½ drachm to a pint of proof spirit. Even then success depended on a slight variation in the manipulation. It did not do, as was pointed out by Mr. Ince, to put the oil of anise directly into the proof spirit and shake them up. If he wished to prepare a pint of tinct. camph. co. according to the directions of the *London* Pharmacopœia he should proceed thus. The directions were to take 25 grains of camphor, 36 grains each of benzoic acid and powdered opium, ½ drachm of oil of anise, and 1 pint of proof spirit. He should take 7½ ounces of distilled water, and 12½ ounces of rectified spirit; in 4 oz. of the rectified spirit he should dissolve the oil of anise, the camphor and the benzoic acid; he should then mix the remainder of the spirit and the water together, shake them up briskly to facilitate the escape of air from the mixture, and allow it to cool down to the ordinary temperature; then pouring that gradually into the solution of oil and camphor, and shaking them up together, a bright solution was produced. Then to that solution he should, under the London Pharmacopœia, have added 1 oz. of tinct. opii, because in that formulary the quantity of opium in the tinct. opii bore a simple relation to that in the tinct. camph. co., being exactly twenty times as much; and besides that the 1 ounce of tinct. opii, added to the previous mixture, almost exactly compensated for the condensation which took place on the mixture of the water and the rectified spirit. In that way he got a tincture which scarcely required filtering at all, and then only from some slight mechanical impurities in the benzoic acid. With regard to the temperature at which these two oils solidified, he found so much divergence amongst the authorities he had consulted that he feared little dependence could be placed upon them. With the oil of *Pimpinella Anisum* one could get a perfect solution of ½ drachm in a pint of proof spirit, but he had not succeeded in so doing with the oil he had been getting for some years past, even varying the manipulation in every possible way. Another thing he had observed with regard to the star-anise was that it was not so attractive to rats and mice as the oil of *Pimpinella Anisum*. Another preparation was spirit of aniseed, which was a very weak spirit, sweetened with sugar; its only use, he believed, being as a cordial for infants. He had never found spermaceti as an adulterant in any specimen of the oil he had examined. There were two very simple tests for this oil, viz., if it were entirely volatilized by heat, and if it were perfectly soluble in rectified spirit; if it answered these two tests there was not much to find fault with. There had been a material alteration in the formula for the tinct. camph. co. in the British Pharmacopœia. The tinct. opii in the British Pharmacopœia was about 9 per cent. weaker, and the tinct. camph. co. about 11 per cent. stronger in opium than those of the London Pharmacopœia, and therefore his practice of using an ounce of tinct. opii to make the tinct. camph. co. of the London Pharmacopœia would not answer for the British Pharmacopœia. It required a rather more complicated calculation to arrive at the exact proportion.

The President proposed a vote of thanks to Mr. Bland for his paper, which was carried unanimously, and the meeting adjourned to December 6.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

On Wednesday last, at the Lambeth Police Court, Sidney Joshua Marsh, oilman, of Lambeth Walk, was summoned by Mr. Templeman, acting on behalf of the Chemists and Druggists' Trade Association, for unlawfully selling oxalic acid, the same not being labelled with the name of the article or the word "poison," together with the name and address of the seller.

Mr. Glaisyer prosecuted for the Association, and Mr. Mayo defended.

Evidence was given to the effect that Mr. Templeman went into the shop and asked for some oxalic acid, and was served with some in a bottle on which there was no label.

In cross-examination by Mr. Mayo, the complainant said he was asked by the defendant what he wanted the oxalic acid for, and he told him to clean some brass-work. He (complainant) was obliged to tell an untruth in order to detect the defendant. The defendant at first declined to serve him at all.

Mr. Mayo, in defence, said there was a deal of epsom salts in the stuff sold by the defendant, and what he had done was in ignorance of the law. He urged also that if there were to be a conviction his worship should make the penalty as low as possible.

Mr. Saunders said it was a clear case, and if ignorance of the law was put forward, he had only to say that parties in whatever business they entered upon were bound to know what was the law appertaining to such business.

Mr. Glaisyer referred his worship to the section of the Act of Parliament showing that the defendant really had no right to sell the poison at all.

Mr. Saunders ordered the defendant to pay a fine of 40*s.*, together with 23*s.* costs.—*Standard.*

Poisoning by Laudanum.

An inquest was held on Monday, October 30, at Mexborough, on an infant named Henry Harrys, son of a miner. The mother of the deceased left the child in

charge of her daughter, aged eleven, and, as it was cross, professedly to quiet it a neighbour gave it five drops of laudanum in some sugar and water. The child lingered in an unconscious state until the next morning, when it died. The medical evidence went to prove that deceased died from the effects of narcotic poisoning.

Mrs. Tomlinson admitted giving the laudanum to the child, but protested that she had no evil intention.

Evidence was also given to the effect that the prisoner was under the influence of drink when she administered the laudanum.

The Jury, after a brief consultation, returned a verdict of manslaughter against the prisoner, who was committed to take her trial at the assizes.—*Leeds Express.*

Obituary.

ALFRED ALLCHIN.

It is with very great regret that we record the death, on Wednesday morning last, of Mr. Alfred Allchin, of England House, Primrose Hill Road, since British pharmacy loses in him one who has served it well and faithfully during a long series of years, and many pharmacists lose a kind-hearted and genial friend. Mr. Allchin was born at East Malling, Kent, on February 28, 1824, and was the youngest son of Mr. W. H. Allchin, surgeon, of that place. He was apprenticed to Mr. Stedman, of West Malling, and subsequently lived with Mr. Poole, of Queen Square, Brighton, and Messrs. Keating, of St. Paul's Churchyard. In the session for 1845–6 he entered the School of Pharmacy, in Bloomsbury Square, where he took the first certificate in pharmacy, and in the ensuing session received the appointment of demonstrator in practical chemistry. In 1848 Mr. Allchin went into business on his own account in the Richmond Road, Barnsbury, where he remained until 1872, when he removed to Primrose Hill Road.

In June, 1870, Mr. Allchin was appointed a member of the Board of Examiners, and he fulfilled the duties of the office up to within a short interval of his death. In the earlier part of his career he occasionally read a paper at an Evening Meeting of the Society, and some of these papers,—as, for instance, one on "Aquaria for the Preservation of Leeches," and another on the "Preparation of Smelling Salts,"—were of considerable practical value. He also communicated a paper on "Infusions" to the present series of this Journal.

Mr. Allchin had been suffering more or less for some time past from the disease to which eventually he succumbed. At the time of the recent meeting of the British Pharmaceutical Conference he was staying for his health in the neighbourhood of the New Forest, and he availed himself of the opportunity to be present. But many of his old friends who saw him there were grieved to mark the change that had already become evident in him, and which was so soon to result in death.

Notice has also been received of the death of the following:—

On the 23rd of September, Mr. Thomas Gardner, Chemist and Druggist, Queen Street, Morecambe. Aged 37 years. Mr. Gardner had been a Member of the Pharmaceutical Society since 1876.

On the 10th of October, Mr. Herbert Inglis, Chemist and Druggist, Every Street, Manchester. Aged 42 years.

On the 20th of October, Mr. John Sweet Cape, Chemist and Druggist, High Street, Exeter. Aged 41 years. Mr. Cape had been an Associate in Business of the Pharmaceutical Society since 1869.

On the 20th of October, Mr. Robert Richmond, Pharmaceutical Chemist, Leighton Buzzard. Aged 67 years. Mr. Richmond had been a Member of the Pharmaceutical Society since 1842.

On the 23rd of October, Mr. Morgan Thomas, Chemist and Druggist, Taff's Well, near Cardiff. Aged 42 years.

Correspondence.

Commercial Nitrate of Silver.

Sir,—With reference to Mr. Woodland's note on nitrate of silver, published in the last number of the *Pharmaceutical Journal*, I may say that I received a small sample of nitrate of silver from my friend Mr. Greenwood of Liverpool, but understanding it had been purchased from an itinerant photographer—whatever that may mean—I took no further notice of the matter.

Had Mr. Woodland stated in his paper, read at the meeting of the British Pharmaceutical Conference at Southampton, that he had purchased pure samples of nitrate of silver from respectable houses (both wholesale and retail), but samples he had purchased from "itinerant photographers" were impure and adulterated with nitrate of potash, I do not think any of the members present would have expressed much surprise; but the tenor of the paper was rather to throw discredit upon a large and respectable body of men who make it their business to supply photographic and other chemicals. This led me and others to protest against such an inference.

I must say I was not previously aware that nitrate of silver was sold by itinerant photographers, and think the propriety of purchasing the article from such a source, even if obtained in a pure and unadulterated state, very questionable.

London. JOHN WILLIAMS.

A Correction.

Sir,—I am much obliged to Mr. Woodland for his courtesy in furnishing his data and elucidating his method of calculation in taking the percentage of morphia in extractum opii liquidum, B.P. I am, however, compelled to take exception to one of his fundamental statements. He says that "one fluid ounce of the liquid extract, specific gravity ·972, will weigh 450 grains." According to this statement it would appear that the weight of a fluid ounce of distilled water is 462·96 grains, but I regret to be under the necessity of informing Mr. Woodland that it is 437·5 grains. I had really hoped that in these days this elementary fact was known to every tyro in pharmacy.

With regard to nitrate of silver, I leave your readers to judge of the wisdom of making general assertions as to its purity or otherwise, from analyses of samples obtained from peripatetic photographers.

St. Thomas's Hospital. SIDNEY PLOWMAN.

Sir,—Mr. Woodland will, I trust, forgive me if I point out a slight inaccuracy which has crept into his calculations published in the Journal last week.

One fluid ounce of liquid extract of opium having the sp. gr. ·972, would weight $437{\cdot}5 \times {\cdot}972 = 425{\cdot}25$ grains, not 450 as stated. From this it follows that the standard morphia percentage, calculated from the data given, is ·61 (instead of ·58) by weight.

W. PICKARD.

*** [A communication to the same effect has also been received, bearing the signature "Specific Gravity."]

J. G. K.—(1) Taylor in his work 'On Poisons' quotes a case, reported by Löbel, of Jena, of a lunatic who died from a dose of one-eighth of a grain of phosphorus. (2) The amount of resin present in a sample would be a good indication of its quality.

Inquirer.—Dr. Symes has pointed out that lemon juice may be preserved unaltered for a long time by heating it to a temperature of 150° F., and excluding it from air at that temperature, provided that the operation be performed in the winter.

J. H.—Apply to the Secretaries of the Societies.

"*Vivisection.*"—(1) The certificate would have to be laid before the Board and accepted, and your name placed upon the Register of Apprentices, before you could enter for the Minor examination. (2) We do not know the address.

C. Jones.—Your letter could not be published without casting an unjust reflection upon those pharmacists in the district who have complied with the law.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Keyworth, Knight, Crook, Rimmington, Williams, Pickard, Henry, Maitland, Drew, Hollingworth, White, Parrott, Medicus, J. H.

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"New York Medical Journal," *August* 1880,
Dr. F. Weir,
in Lecture delivered to the College of Physicians and Surgeons, New York.

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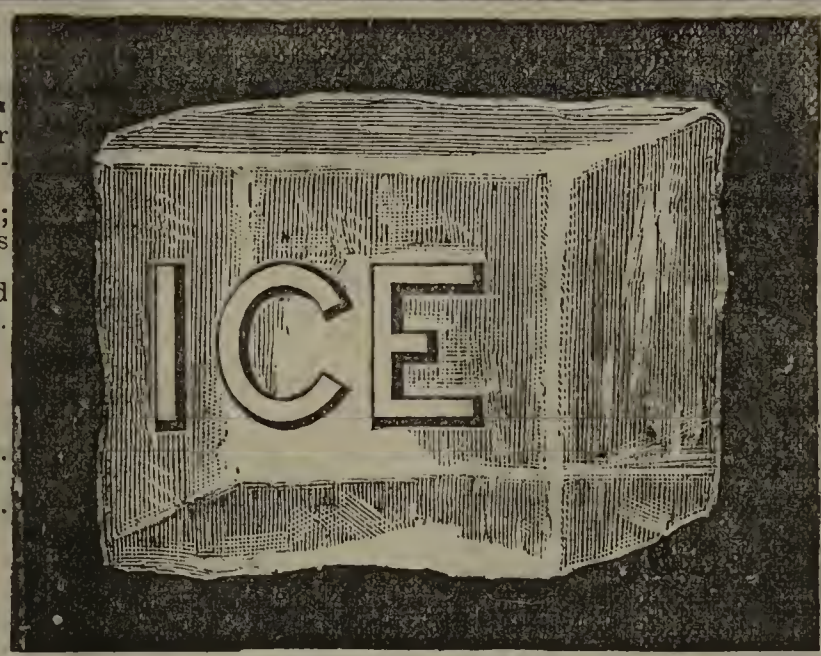

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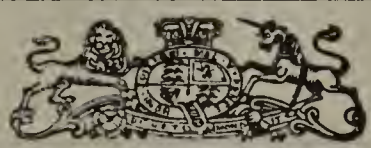

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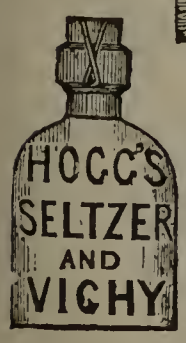

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As a proof of the thoroughness of the Education in this College, it is only necessary to refer to the result of the Minor Examinations held in London this month. It will be seen that whilst ONLY 10 succeeded in passing from all other Schools combined, 18 were successful in passing from the Westminster College.

MINOR EXAMINATION, London, October, 1882.

From Westminster College alone, 18.

Mr. F. T. BROUGH.	Mr. J. F. GUMMOW.
,, C. E. O. BETTS.	,, T. E. HEYNES.
,, W. BRAY.	,, R. D. MILLWARD.
,, A. CARDWELL.	,, D. REES.
,, H. C. DADSON.	,, T. HUDSON.
,, F. G. DEACON.	,, A. PELL.
,, G. S. DUNN.	,, R. W. REES.
,, C. P. DYE.	,, F. G. TREHARNE.
,, W. A. EASTE.	,, G. A. YATES.

From all other Sources combined, 10.

Mr. H. S. COOPER.	Mr. G. R. PROTHERO.
,, M. DODSWORTH.	,, J. ROBERTSON.
,, T. FAWSETT.	,, E. F. SALMON.
,, F. W. MADDOX.	,, T. W. SURMAN.
,, W. F. NORMAN.	,, H. J. TOTTLE.
,, W. J. PINCHEN.	

The following Students were also successful in passing their Examinations from this College.

MAJOR.
Mr. E. FLETCHER. | Mr. MACDERMOTT. | Mr. R. F. ROPER.

MINOR (EDINBURGH).
Mr. A. G. COBDEN. | Mr. F. P. MOORE. | Mr. R. W. WATSON.

PRELIMINARY.
Mr. BERTRAM. | Mr. MAHOOD. | Mr. N. REID. | Mr. SPRY.

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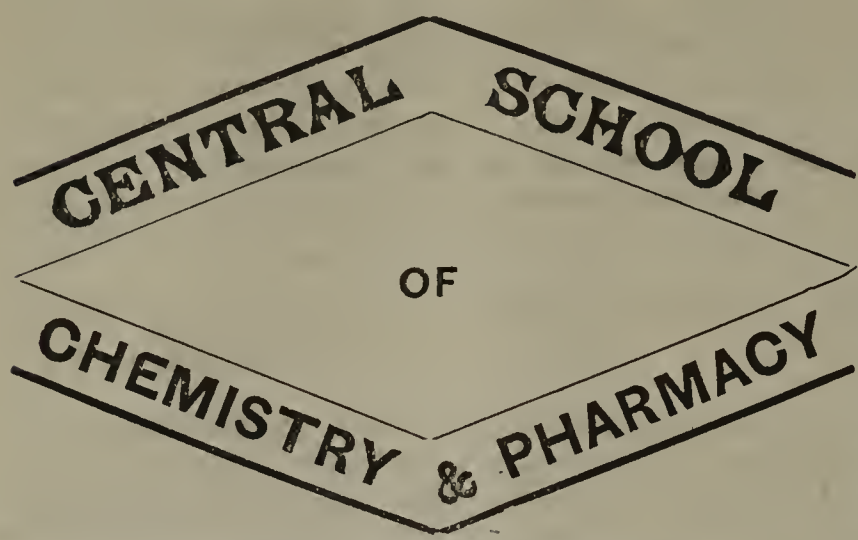

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6 Major Candidates were recommended to present themselves, the following **4** passed.

Mr. Foden. | Mr. Rouw.
„ Parker. | „ Steel.

9 Minor Candidates were recommended to present themselves, the following **7** passed :—

Mr. Cooper. | Mr. Pinchen.
„ Maddox. | „ Prothero.
„ Ombler. | „ Surman.
Mr. Tottle.

1 Modified Candidate presented himself and passed :—
Mr. Colvin.

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A JUNIOR ASSISTANT, age about 21, of gentlemanly appearance and address, for good-class Mixed country trade. Duties light, with plenty of time for study. Apply, stating age, height, reference, and salary required, to BENJAMIN D. GALL, Woodbridge. Enclose carte (to be returned).

AN experienced, qualified ASSISTANT, about 25, of gentlemanly appearance and address, and accustomed to a good class business. Out-door. Liberal salary to a good man desiring a permanency. In reply, state age, height, and salary required, with references and photo., to Mr. ARBLASTER, Chemist, New St., Birmingham.

TO Parents and Guardians.—A gentlemanly and well-educated youth as in-door APPRENTICE in a Dispensing and light Retail business. Must have passed or be prepared to pass Preliminary examination. Terms 4 years. Premium required. References exchanged. ARTHUR GRESSWELL, Pharmaceutical Chemist (Exam.), Commercial Rd., Portsmouth.

ASSISTANTS WANTED.

IMMEDIATELY.—An ASSISTANT. Accustomed to good class Retail and Dispensing. One who has passed the Minor preferred. Age not under 24. Address, with references, to CRUSE & Co., Chemists, Southsea, Hants.

A GENTLEMAN, engaged in study during the forenoon and afternoon, wishing to give the rest of his time for board and lodging. Apply, giving age, height, experience, and references, and if by letter enclosing photograph, to H. J. LANGHAM, 74, Mountgrove Rd., Highbury. Applications four days unanswered declined.

A JUNIOR ASSISTANT or IMPROVER, or a youth who has served part of his time. State age, height, and last situation. Apply to Messrs. GIBBS & GURNELL, Ryde, Isle of Wight.

MANCHESTER.—WRIGHT & BARNABY, Pharmaceutical Chemists, 223, Oxford St., near Owen's College, require an in-door ASSISTANT. About 24 years of age. Accustomed to a Dispensing business. State age, height, salary, when at liberty, and enclose carte (to be returned).

A JUNIOR ASSISTANT, accustomed to a first-class Dispensing business, who can speak French. S. J. WESTON, 151, Westbourne Ter., Hyde Park, W.

AN ASSISTANT. Apply by letter to Mr. POUND, 60, Leather Lane.

APPRENTICE.—A West-end Chemist has a vacancy for a well educated gentlemanly youth. One who has passed or is prepared for the Preliminary examination. Address, in first instance, C. L. T., care of Messrs. Barron, Harvey & Co., Giltspur St., London, E.C.

IMMEDIATELY.—A qualified ASSISTANT, speaking French, and well up in French Pharmacy. Apply personally to SCHOUVER, Chemist, Princes St., Hanover Sq., London.

AN ASSISTANT, about 21 or 22 years of age, for a good class Dispensing business. Address, stating age, height, and salary required, with carte, if convenient, to Mr. BULLEN, 36, Church Rd. (West), Brighton.

EARLY in December. — In-door ASSISTANT, about 25 years of age. Minor qualification. Able to Prescribe and Extract Teeth. Apply, stating age, experience, height, salary, and references (which must be good). Total abstainer preferred. A. B. C., care of Messrs. Barron, Harvey & Co., Giltspur St., London, E.C.

IMMEDIATELY.—An ASSISTANT, of gentlemanly appearance, about 24 years of age, for a first-class Dispensing and Retail business. Apply, stating usual particulars, to Mr. WILLIAMS, High St., Hampstead, N.W. P.S.—Also a vacancy for an APPRENTICE.

A GOOD qualified ASSISTANT. Age from 22 to 30. In-doors. Good salary to a good Dispenser and Counterman. Apply, with references, &c., to W. BANBURY, Dursley.

EXPERIENCED and steady qualified ASSISTANT, to Manage a business in a London suburb, E. An unmarried man seeking permanency preferred. Write, stating age, height, qualifications and salary expected, enclosing photograph, to W., care of Chas. Saunders, Chemist, Highgate, N.

ONE or two steady young men, with knowledge of drugs, to work in the manufacture of Pharmaceutical preparations. Apply by letter, stating age and experience, H. C., Messrs. Rowsell & Son, 31, Cheapside, E.C.

DRUG Trade.—CLERK, for invoicing. Must have a knowledge of the trade, and be a good writer. Apply by letter only, stating age, salary required, and last employ, to PHYSIC, care of Messrs. G. Street & Co., 30, Cornhill, E.C.

ASSISTANTS WANTED.

OUT-DOOR ASSISTANT. Immediately. With London experience and Minor qualification. Under 30 years of age. Apply to A. W., 65, Elizabeth St., Eaton Sq., S.W.

BUSINESSES FOR DISPOSAL.

BY order of the Executor of the late Mr. E. C. Coverley.—The Chemist's BUSINESS situated at 4, Thayer St., Manchester Sq., W., is for immediate disposal. The returns average £625 for the past 3 years. Rent £100, of which £80 is let off. Price £500. Apply for further particulars, by letter, to Mr. H. G. E. TURIES, at above address, or to C. H. WARNER & Co., 55, Fore St., E.C.

MALLOW, Co. Cork.—Important to Apothecaries and Pharmaceutical Chemists.—To be sold, the interest in the well established BUSINESS of Fitzgerald's Medical Hall, situate in the main street, Mallow, and having an extensive connection in the town and neighbourhood. The shop, which has been recently remodelled, is fitted in the most tasteful, expensive and modern style, and is fully stocked and supplied with all necessary appliances, business having been carried on up to the present. The owner is disposing of the above solely in consequence of his inability to give it his personal attention. Proposals will be received by WILLIAM J. FITZGERALD, Solicitor, Mallow, to whom all enquiries, &c., can be addressed.

BONA fide Prescribing and light RETAIL. Main thoroughfare, populous neighbourhood, London, W. Shop well fitted in mahogany. Returns £8 to £10 weekly. Under management, with small stock. Can be doubled by energetic principal. Rent, with house and large garden, £45. Part let at £40 per annum. Price £450. Address, N. N., Maw & Sons, Aldersgate St., E.C.

A SMALL Dispensing and Prescribing BUSINESS. Genuine. Commanding position and good thoroughfare. Address, CHEMICUS, for particulars, to Mr. Guest, 126, Newington Causeway, London.

MIDLAND Counties.—Genuine Country BUSINESS. Returns about £900. Good house and premises. Full particulars, W. J., Messrs. Barron, Squire & Co., Bush Lane, Cannon St., E.C.

DISPENSING and Retail BUSINESS. N.W. Established 14 years. Returns about £12 or £13 per week. Shop well fitted and stocked. Good house. Rent £60. Part let off. Thorough investigation allowed. Price £500. Address, J. W., 32, Osnaburgh St., Regent's Park, N.W.

IMMEDIATELY.—A genuine Dispensing and Agricultural BUSINESS. Established 40 years. Has been neglected through ill-health. Might be greatly increased. Price about £330. Apply, C. TUCKER, Pharmacist, Bridport.

IMMEDIATE offer. Genuine and profitable RETAIL, with Post Office. In London, S.E. Returns over £450. Old established and well stocked. Good opportunity for a beginner. H. TAYLOR, 6, Bird St., Brook St., Kennington Rd., S.E.

NORTH Wales, Coast.—Genuine Family Retail and Dispensing BUSINESS. Shop well fitted and stocked. Very satisfactory reasons for sale. Returns £500. Lease can be had. An exceptional chance for a beginner. Price, valuation. For further particulars apply R., Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C.

SOUTH Devon.—In a market town, an old established BUSINESS, light Retail and Prescribing, at full prices. Present receipts over £550. Price £450. No agents. Thorough investigation allowed. Address, S., 100, New St., Birmingham.

BUSINESSES FOR DISPOSAL.

MESSRS. GURDEN BERDOE have for transfer:—EASTERN COUNTIES. Old established Retail and Prescribing Trade. Same hands 30 years, and now retiring. Returning over £800. Will accept £650 to effect early sale. Several valuable proprietaries. Also, unopposed Village Trade. Returning £400. For £125. Good garden. BEDS. Returning £4 weekly and neglected. £130. Well stocked. HANTS. Same hands 20 years. Returning £350. Rent £25. £150. BANKS OF THAMES. Delightfully situated. Returning £700. Same hands 12 years. Good house and garden. £550. LONDON, N. Old established unopposed Retail. Returning £450. Same hands 10 years. Only £375. S.E. Unopposed Retail. Returning £7 weekly. For £150. Please apply, 30, Jewry St., Aldgate, City.

MR. HINE GILBERT wants purchasers for Businesses in NORTHERN SUBURB. Only £120. Busy town in KENT, £140. BRISTOL, £360. KINGSTON, £500. Seaside, KENT, £1000. SUSSEX, £600. FOREST HILL, £500. ESSEX, £950. NORFOLK, £400. YORKSHIRE, £1200. LANCASHIRE, £1000. SOMERSET, £2000. And many others on application at 17, Hart St., Bloomsbury Sq.

CHEMISTS.—General Drug, Patent Medicine, Oils, Paints, Colours, Wines, Teas, Brushes, Druggists' Sundries BUSINESS. Full prices. No opposition. Established by present proprietor over 24 years, who wishes on account of state of health to leave. Price £750. Ready money. Address letters (till called for) to JOHNSON, Post Office, Stourbridge.

BIRMINGHAM.—Chemist's BUSINESS. Good corner shop. Well fitted. In a main thoroughfare and very populous locality. The business is capable of much further extension. Satisfactory reasons given for disposal. Full particulars from RICHARD TOMLINSON, St. Paul's Sq., Birmingham.

IMMEDIATELY.—Genuine old established ready-money BUSINESS in Norwich. Central position. Improving neighbourhood. Good house. Returns from £500 to £600. Profits about half. Rent, rates and taxes moderate. Goodwill nominal. Stock, &c., at valuation. Address, MASONIC, care of Messrs. Smith & Sons, Magdalen St., Norwich.

LONDON, N.—An old established ready-money Retail, Prescribing and Dispensing BUSINESS, doing about £500 per annum under management, and can be much improved. Good stock. Corner shop, plate-glass fronts. Private entrance. In present hands over 30 years. A good opportunity for an energetic young man. Terms moderate and easy. Address, A. B., Messrs. Hewlett & Son, Charlotte St., Gt. Eastern St.

YORKS, North Riding.—Death vacancy. An old established Family and Dispensing BUSINESS. Only changed hands once in 35 years. Pleasant locality. Good class customers, and full prices. Average returns £1200. Large and convenient premises on favourable terms. An immediate purchaser will be liberally dealt with. Apply to T. TRIPPIER, 79, Islington, Liverpool.

WANTED TO PURCHASE.

BY Advertiser, having £1200 at command, a good Retail and Dispensing BUSINESS. Address, with full particulars, by letter only, E. WALTON, care of Messrs. Hearon & Co., 5, Coleman St., E.C.

A LIGHT Retail and Dispensing BUSINESS. Returning about £1000. Address, with full particulars, to F. WIMSHURST, The Cottage, Brenchley, Staplehurst.

FOR a short time, the Management, with view to early purchase, of a BUSINESS. Age 27. Disengaged early in January. South of England preferred. Particulars to CHEMICUS, 8, Upper Prospect Pl., Southampton.

HENRY GADD,

Member of the Pharmaceutical Society,

CHEMISTS' TRANSFER AGENT,

97, FORE STREET, EXETER.

Gentlemen seeking Businesses are requested to write for information concerning any of the following which are likely to be suitable.

1.—KENT. Excellent high class Dispensing and light Retail TRADE. Price £750.
2.—CORNWALL. Handsome and recently fitted SHOP in large town. Good class trade. Returns £550. Price £500, or valuation of stock and fixtures.
3.—LONDON. Returns £575. Proprietor having purchased a larger business. £525, or a reasonable offer will be entertained.
4.—LONDON. £400 will be accepted for very handsomely fitted SHOP, returning over £500 per annum.
5.—LONDON. Present returns £350. Price £300.
6.—PLYMOUTH. Main thoroughfare. Returns £400. Price £350.
7.—SOMERSET. Mixed TRADE. Average profit £300. Valuation of stock and fixtures. No goodwill.
8.—WEST OF ENGLAND. Average returns £380. Price £250.
9.—DEVON. Proprietor going out of the trade will dispose of his BUSINESS, yielding between £200 and £300 net profits, for £300 cash.
10.—High class Dispensing TRADE. Returning over £700 per annum. Offered for £700.

H. GADD is instructed to purchase Businesses returning from £2000 a year.
No charge to purchasers.

TO CHEMISTS, DRUGGISTS, AND DEALERS IN BULLION, PRECIOUS STONES, &c.

NOTICE is hereby given that the Court of Quarter Sessions for the County of Middlesex has provided an office in the Sessions House, Westminster, for the verification and marking of apothecaries and decimal grain weights and measures, and that two of the County Inspectors will be in attendance there on Monday and Thursday in every week, from 11 till 1 o'clock, after the 10th November instant, until further notice. All persons concerned are recommended to take this opportunity of having their weights and measures duly verified and marked, before the County Inspectors visit their shops and warehouses for the purpose of examining with the standards weights and measures of the above description.

Dated this 1st day of November, 1882.

RICHARD NICHOLSON, *Clerk of the Peace.*

Sessions House, Clerkenwell, E.C.

WYE HOUSE ASYLUM, Buxton, Derbyshire, for the Middle and Upper Classes of BOTH SEXES, is beautifully situated in the healthy and bracing climate of the Derbyshire Hills, and is directly accessible by the Midland and London and North Western Railways. For terms and other particulars, address the Resident Physician and Proprietor, Dr. F. K. DICKSON.

Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xviii.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—In consequence of the increased demand for Mr. BRETT's services as a Valuer, it is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

F. J. BRETT has always on his Register between 200 and 300 Businesses in all parts.

STATEMENTS prepared for Meetings of CREDITORS.

F. J. BRETT's practical knowledge of the trade in all its branches renders him specially adapted to act as trustee in Liquidations and Bankruptcies. Chemists in difficulties can have their affairs settled by private arrangement.

NORTH STAFFS.—Old established General RETAIL, at good prices. Returning £1700. Convenient dwelling house. Large garden, &c. Good market town. At valuation of stock and fixtures—about £800.

CAMBRIDGESHIRE.—Dispensing and light RETAIL, of very profitable character. Low rent. Returns £860.

LONDON, S.E.—Old established RETAIL. Under bad management returns £10 week. In capable hands can be doubled. Valuable lease. Price £600.

DURHAM CO.—Old established Dispensing, Prescribing and light RETAIL, with family connection in Wines and Spirits. Drug returns £1300, Wines and Spirits £800. To an energetic man this presents unusual facilities for extension. Goodwill £100. Stock and fixtures at valuation—about £800.

EASTERN COUNTIES.—Very profitable light Retail and Family TRADE, in healthy market town. Rent £35. Lease. No heavy trade. Returns £1300. Price £700.

GLOUCESTERSHIRE.—Light Retail and PRESCRIBING. Returns £240. Surgeon will assist. Low rent. Price £60.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

TENCH & TAYLOR,

Licensed Valuers and Transfer Agents,

WALBROOK CHAMBERS, 38, WALBROOK,

LONDON, E.C.

(Where the late Mr. Jacobson conducted his business for upwards of 20 years).

Gentlemen seeking investments are respectfully requested to apply to Messrs. T. & T. for their PRINTED REGISTER, which contains particulars of businesses ranging in price from £80 to £2500.

No charge is made to purchasers.

N.B.—Appointments for valuation should be made (if possible) at least seven days beforehand.

IMPORTANT TO DENTISTS.

THOROUGH instruction given in Mechanical Dentistry, Gold Filling, administration of Gas, &c., &c., by a thoroughly practical man. For terms, enclose stamped envelope to DENTIST, 16, Vicars Rd., Haverstock Hill, London, N.W.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business, will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

MESSRS. ORRIDGE & CO. are instructed to transfer the following businesses, particulars of which, with order to view, may be obtained on application:—

1. LONDON, N.—Good-class locality. Retail and Dispensing BUSINESS. Held by present owner for 17 years. Returns nearly £800 yearly. Net profit above the average. Good opening for Dentistry. Price about £700.
2. LONDON (within easy distance of).—Retail and Dispensing BUSINESS. Returns £1000 yearly (net profit half). Vendor being obliged to relinquish business through illness is anxious for an immediate sale. Terms easy.
3. LONDON, N.W.—Good-class Retail and DISPENSING. Returns £650 yearly. Shop well fitted. Established 28 years. Nearly all ready money. Good house. Lease 14 years. Offer wanted.
4. WESTERN COUNTY, Seaside.—Good-class Retail and DISPENSING. Returns over £700 yearly. Good house. On lease. Rent moderate. Full particulars on application.
5. MANCHESTER.—Very old established Retail and Dispensing BUSINESS. Returns nearly £1000. Vendor retiring from the business. Price about a year's returns.
6. LEEDS.—PARTNERSHIP. Amount required about £700. Full particulars on application.
7. KENT.—Short distance from town. Retail and Dispensing and Prescribing BUSINESS. Profits good. Well-fitted shop. Capital situation in the centre of the town. Returns last year £660. Price about £600.

A number of small Businesses, varying from £100 to £300. Town and country. Particulars may be obtained on application.

ORRIDGE & CO.
32, Ludgate Hill, E.C.

FOR SALE CHEAP.

THE complete STOCK and FITTINGS of a Chemist's shop, comprising Counters, Cases, Drawers, Bottles, Ointment, Extract, Honey, and Leech Jars, Carboys, Scales, Specie Jars, Desk, Lamp, &c. LINDEN, Broughton, Winchester.

FLETCHERS' Concentrated Liquors.

We beg to direct attention to the following important additions to our List of Liquors for the extemporaneous production of Syrups.

Liquor Cocci.

A highly concentrated and *neutral* solution of the colouring matter of Cochineal.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUPUS COCCI.

Liquor Croci.

IN the manufacture of this preparation, only the finest Valencia Saffron is employed.

ONE volume added to three volumes of *Syrupus, B.P.*, forms SYRUP OF SAFFRON.

Liquor Ipecacuanhæ.

THIS preparation is eight times the strength of *Vin. Ipecac. B.P.*

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUP OF IPECACUANHA.

Liquor Limonis.

PREPARED from the Fruit, and guaranted free from Artificial Essences.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms the SYRUP OF LEMONS of the British Pharmacopœia.

Liquor Papaveris.

PREPARED from the Capsules of the White Poppy.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUP OF POPPIES of full Pharmacopœia strength.

Liquor Rhei.

IN the manufacture of this preparation, only the finest East Indian Rhubarb is employed.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUP OF RHUBARB of full Pharmacopœia strength.

Liquor Sennæ.

A fluid ounce of this preparation contains the soluble portion of four ounces of Senna.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUP OF SENNA of full Pharmacopœia strength.

Liquor Tolutani.

PREPARED from the finest Tolu Balsam.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms SYRUP OF TOLU of full Pharmacopœia strength.

The above are supplied in ½-lb. Bottles at 2/3 each, and in 1-lb. Bottles at 4/- each. Special quotations for large quantities.

On receipt of a Post Card, trial samples will be sent, carriage paid to any address.

Detailed List, containing prices and particulars of upwards of thirty different combinations, post free on application.

FLETCHER, FLETCHER & STEVENSON,
Holloway, London, N.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 646.] SATURDAY, NOVEMBER 11, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 6th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of	
Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
Half-a-guinea	FIVE Votes
One Guinea	TEN Votes.
And to increase in the same proportion.	
Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas	TEN Votes for life.
And to increase in the same proportion.	

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

WANTED.—The PHARMACEUTICAL JOURNAL for January 11th, 1873, and January 6th, 1877. Full price will be given by the Secretary, 17, Bloomsbury Square, W.C.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

CHEMISTRY AND PHARMACY. .....Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY .....Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

Comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.
2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.
3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

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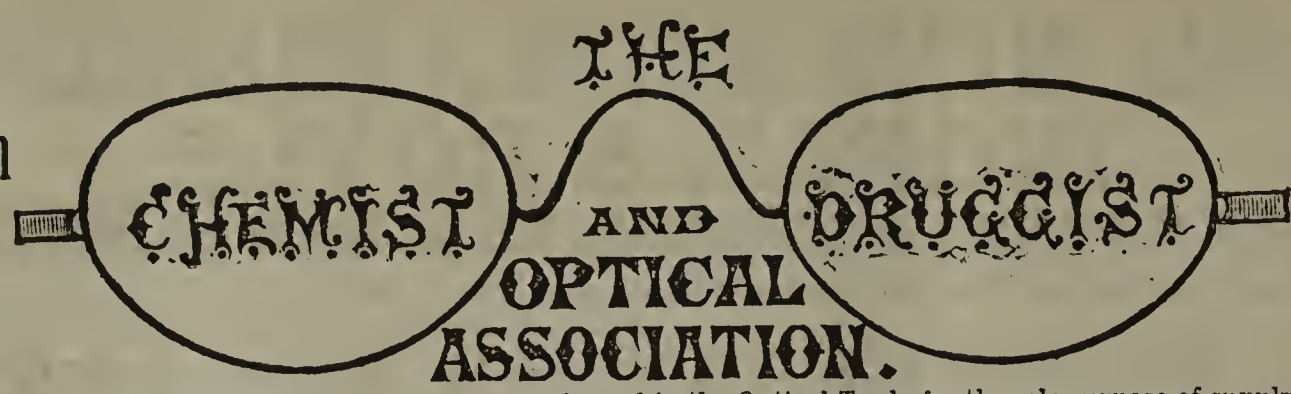

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IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & CO., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

DEAR SIR,—Have the goodness to furnish us with your best quotations for Dr. J. COLLIS BROWNE'S Chlorodyne, as, being large buyers, we would much prefer doing business with you direct than through the wholesale houses. We embrace this opportunity of congratulating you upon the wide-spread reputation this justly-esteemed medicine has earned for itself, not only in Hindostan, but all over the East. As a remedy of general utility we much question whether a better is imported into the country, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances, *ad infinitum*, of the extraordinary efficacy of Dr. COLLIS BROWNE'S Chlorodyne in Diarrhœa and Dysentery, Spasms, Cramp, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than COLLIS BROWNE'S, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than COLLIS BROWNE'S is a deliberate breach of faith on the part of the chemist, to prescriber and patient alike.

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Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
Morphiæ Sulphas ....1-6 grain.	Strychniæ Sulphas ..1-150 grain.
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THE JAPANESE PEPPERMINT PLANT.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

When examining some leaves of this plant, presented, together with a series of Japanese drugs, to the Museum of the Pharmaceutical Society, by Messrs. Christy and Co., in 1879, I thought it desirable to compare them with those of the plant which is stated to yield the Chinese oil of peppermint. Through the courtesy of the keeper of the Kew Herbarium, I was permitted to taste a fragment of a leaf of the Chinese plant and of one of Blume's specimen of *M. arvensis*, L., var. *Javanica*, the plant to which this peppermint is referred in 'Pharmacographia.' To my surprise I found that neither Blume's specimen nor any others of the same plant from various localities had the taste of peppermint, but possessed a flavour similar to that of the garden mint (*M. viridis*). Judging that the Japanese plant could not belong to *M. arvensis*, var. *Javanica*, I referred to the Japanese work 'Zo Mokou Zoussetz,' in which the Japanese peppermint plant is stated to be *Mentha arvensis*, var. *vulgaris*, Benth. On tasting the type specimen of this plant at Kew, I found that this also did not possess the taste of peppermint, but only that peculiar to European specimens of *M. arvensis*. I therefore wrote to China and Japan for specimens of the peppermint plants of those countries. After the lapse of more than a year, Mr. C. Ford, the director of the Botanical Gardens at Hong Kong, was able to procure a flowering specimen of the Chinese plant for me, but no specimens of the Japanese plant could be procured by my correspondents. Mr. T. Christy, however, after having first obtained seeds of the plant, attempted to grow them, without success, but was ultimately, and after considerable difficulty, able to procure from Japan living plants which flowered this year in his garden at Sydenham, and a specimen of the plant was exhibited for the first time, I believe, in this country, at the meeting of the Pharmaceutical Conference, at Southampton. On careful examination, both the Chinese and Japanese plants thus obtained were found to possess the botanical characters of *Mentha arvensis*, as defined in De Candolle's 'Prodromus;' the leaves being stalked, ovate lanceolate, and the hairs on the stems and pedicels reflexed, those of the calyx being erecto-patent, and those of the upper surface of the leaf appressed, the calyx being bell-shaped with acute lanceolate or narrowly-triangular teeth. The Chinese plant differs from the Japanese one in the leaves being narrower in proportion to their length and in the calyx teeth being shorter and more broadly triangular. In outline, the leaves of both plants taper more to the base and have a longer petiole than the English forms of *M. arvensis*, coming very near to *M. canadensis* in this feature. The latter plant, however, has spreading hairs on the stem. The Chinese plant appeared to so nearly resemble *M. canadensis*, var. *glabrata*, that I applied to Professor Asa Gray for specimens of that species for comparison. The specimens of *M. canadensis* which he kindly forwarded to me were derived from different localities in the United States, and varied considerably in taste and appearance, some having the flavour of pennyroyal, others that of *M. viridis*, and others again that of peppermint, in a feeble degree. The specimen having a peppermint flavour is labelled *M. canadensis*, var. *glabrata*; it has reflexed hairs on the stem and differs from the typical plant in having more triangular and shorter calyx teeth, which, as well as the petioles, have erect hairs; in fact, it appears in every respect to be the same plant as that grown at Canton. It is not surprising, however, to find Japanese or Chinese plants extending to North America.

It appears, then, that there are two plants possessing a widely different taste and both referred to *M. arvensis*, var. *Javanica*, by botanists. This might lead to confusion if the Chinese or Japanese peppermint plants ever came into demand for purposes of cultivation, unless a special name be given to the form which possesses the peppermint flavour, even although it does not possess characters sufficiently definite to separate it from *M. arvensis*. The mints are well known to form an uninterrupted series of plants which it is difficult to separate into species. Deeming it advisable, therefore, before giving it a name, to consult those botanists who have critically studied the mints, specimens of the Japanese peppermint plant were forwarded to several authorities on the genus, and the following opinions have been expressed:—Mr. J. G. Baker, of the Kew Herbarium, considers it to be a form of *Mentha sativa*, Sm. (It may be here remarked that this form, as recognized by Hooker and Babington in their 'British Floras,' is a species differing from *M. arvensis* in the smaller upper leaves and longer calyx teeth, while De Candolle includes it under *M. arvensis*.) Professor Baillon, of Paris, expresses the opinion that it must be referred to *M. arvensis*, var. *Javanica*, unless it be a hybrid between *M. arvensis* and *M. piperita*. Dr. Garcke, of Berlin, finds the plant to be nearly allied to *Mentha canadensis*, D.C., and also to *M. aquatica*, var. *subspicata*, D.C. Dr. Franchet, one of the authors of the most recent 'Flora' of Japan, believes the Japanese plant to be "a form of *M. arvensis*, characterized by the acuminate calycine segments, a feature which constantly occurs in specimens from Eastern Asia." He adds, "After carefully comparing your specimen and having vainly sought an analogous taste in the different forms of the *M. arvensis* of Europe, I have found in them only an insipid and herbaceous flavour; I can say the same of *M. arvensis* from the neighbourhoods of Pekin and Chefu, in the province of Shantung, and from the neighbourhood of the lake Sitau, in the province of Sche-kimy; but I find the taste of peppermint developed in a very high degree in a specimen gathered at Voosung, near Shanghai. From Japan I possess specimens of *M. arvensis* gathered in very many localities and I have found the taste of peppermint in all my specimens, without exception. This taste is absolutely the same as that furnished by your plant. I remark, however, that the taste is more pronounced in proportion as the plants are more robust; puny specimens with small leaves from Kanasawa (in Nipphon) possess it only in a feeble degree." He thinks that the peppermint flavour is not the result of hybridity, since no other species has hitherto been observed in Japan, either in a cultivated or wild state, except *M. crispa* ('So Mokou Zoussetz,' xi., pl. 29) (which no botanist, that he is aware of, has ever brought back from that country), and *M. gentilis*, which is well delineated under the name of *M. arvensis* on the same page as *M. piperita*, after information probably furnished by the Dutch. M. Malinvaud

remarks that the name *piperita* cannot be appropriated to the Japanese plant, as it is already applied to a form of *M. arvensis* with flower spikes. He therefore suggests the name *Mentha arvensis*, var. *piperascens*.

The weight of opinion is therefore on the side of considering the Japanese plant as a form of *Mentha arvensis*, D.C. If *M. sativa*, Lin., and *M. arvensis*, as defined by Babington, as well as *M. Javanica*, D.C., are to be considered as forms of one species, then the Japanese plant might, I think, also rank as a form under the name of *M. arvensis f. piperascens*, differing from *M. arvensis* as described by Babington in having the calyx teeth longer than broad, and in the upper leaves being gradually smaller; from *M. sativa*, in the leaves having longer stalks and tapering below; from *M. Javanica*, in the uppermost leaves being more than twice (usually six or eight times) as long as the verticillasters, and in the veins being hairy on the under surface of the leaf whilst those on the calyx are erecto-patent; and from *M. canadensis*, in the reflexed pubescence of the stems.

With respect to the Chinese peppermint plant, it so exactly agrees with the specimen of *Mentha canadensis*, var. *glabrata*, furnished to me by Dr. A. Gray, that if the latter be a typical specimen* I can only consider that it should be referred to *M. arvensis*, under the name of *M. arvensis*, var. *glabrata*.

Dr. Gray's specimen has the calyx teeth much shorter than those of the typical *M. canadensis* sent at the same time, and the hairs on the stem and pedicels are reflexed, while those of the calyx tube are erecto-patent.

There are some other points in connection with peppermint which are extremely suggestive, and to which I desire to call the attention of those who have greater ability and more time for investigation than myself.

A number of varieties and forms of so-called species possess the same odour and flavour, as shown in the following list:—

Mentha piperita, *Mentha arvensis*, var. *piperascens*, *M. canadensis*, var. *glabrata* (!), and *M. incana* (!), cultivated near Bombay for producing peppermint oil (Dymock).

Spearmint, *Mentha viridis*, L., *Mentha sylvestris* (!), *rotundifolia* (!), *sylvestris* (!), *canadensis* (!),† *M. arvensis*, var.

The questions then arise:—

1st. Do the oils of these species differ among themselves, as has been shown to be the case with those of *M. piperita* and *M. arvensis*, var. *piperascens*?‡

2nd. If so, is this difference dependent on degree of development, on climate, soil§ or sex?

3rd. Is the oil in each case a mixture, in which one ingredient is present in variable quantity in the different plants?

4th. Do the oils of spearmint and peppermint bear any chemical relation to each other?

5th. Which species, containing an oil of peppermint, yields the largest quantity and which the most valuable one for medicinal purposes?

To recapitulate: The writer would recommend that for convenience the name of *Mentha arvensis f. piperascens* should be retained for the Japanese peppermint plant and that of *Mentha arvensis f. glabrata* for the Chinese one.

* Dr. Franchet notes, in his 'Flore du Japan,' the reflexed leaves in some specimens of *M. canadensis*.

† Those marked (!) have been tasted by myself.—E. M. Holmes.

‡ *Pharm. Journ* (3), ii., p. 321.

§ Mr. J. Lloyd found a variety of *M. aquatica* possessing a lemon odour on *calcareous* soil near the sea, and M. Malinvaud a specimen of *M. arvensis* with a lemon odour in a ditch near Ivry, where other plants of the same species possessed only the usual odour of the plant.—*Bull. Soc. Bot.*, 1881, p. 370,

RESEARCHES UPON THE JALAPS.*

BY A. BOURIEZ.

In commercial specimens of any kind of true jalap (tuberous, fusiform, or Tampico) several varieties of tubercules can be distinguished by their external characters. Those which constitute the greater part of the jalap, and which I designate under the name of "typical tubercules," always present at one of their extremities (the upper) the remains of aerial organs. Sometimes they terminate in a point at both their extremities; sometimes one of the extremities only becomes slender, whilst the other presents a large surface of insertion. There are met with, besides, tubercules inserted on other tubercules, and very small fragments [*grabeaux*] showing tubercules inserted upon an organ which is most frequently slender and cylindrical, but sometimes fusiform and more or less swollen. The question presented itself to me, whether these tubercules of the different varieties answered to variations in appearance of one and the same organ, or whether they represented organs of a different morphological nature.

An examination with the naked eye, and aided by a glass, of transverse sections made at different points of these tubercules, yielded me some useful information, but not sufficient to answer the question with certainty. I then submitted the same sections to a microscopical examination.

As a basis for this micrographic study I selected a typical tubercule of the tuberous or official jalap.

A transverse section made at the lower extremity of the tubercule enabled me to conclude that the organ there presents the structure of a root. Towards the centre of the section there were observed four primary woody layers, symmetrical around the centre, and convergent in pairs. Each of these layers is formed of some spiral vessels, the most slender of which are nearest the exterior, the largest being nearest the centre. The differentiation has therefore proceeded in each of these primary ligneous layers from the centre of development (indicated by the most slender spiral vessels) towards the centre of the organ. It may thence be concluded that the centre of the organ is occupied by a single tetracentral primary bundle, the centre of which coincides with the centre of the organ, and it may be inferred from this conclusion that the organ, at this stage, is a root.

Among the histological details presented by this root, I will refer here only to the formation of the elements of the liber. Among the young cells with tangential divisions belonging to the cambial zone, the most external present very early longitudinal septa, which subdivide them into a number of narrow elongated cells, such as are seen in the Asclepiadaceæ, Apocynaceæ, Solanaceæ and Acanthaceæ. The transverse septum which separates two superposed cells is reabsorbed, following the meshes of the tissue, and in this way are originated the per-

* From the *Journal de Pharmacie*, [5], vi., 329.

forated plates of cells characteristic of the liber. The elements of the cambial zone which do not present these septa make up the liber parenchyma, in the midst of which occur numerous resiniferous cells and glands containing crystals.

The resin-cells would appear to be parenchymatous elements, hypertrophied and gorged with resin. Generally they are superposed end to end, so as to form rather long vertical rows; but in no case have I observed the reabsorption of the wall common to two successive cells. There is therefore no formation of a canal, and I look upon these resin cells as unicellular glands distributed in the mass of the liber.

The crystal-bearing glands consist of parenchymatous cells, subdivided into as many compartments as they contain groups of crystals. These groups are sphæraphides of oxalate of lime. A radial section, treated with a mineral acid which dissolves the oxalate of lime, shows readily the subdivision of these glands.

I will now briefly sketch the structure of the part of the tubercule comprised between the lower extremity and the point which corresponds to the maximum volume of the organ, setting forth the mechanism of the formation of the tuber.

In sections which follow those which presented the structure of a well-characterized root, there is observed, in proportion as they rise towards the central part of the tuber, the interposition, among the hardened and characteristic elements of the root, of a parenchymatous tissue, supplied at first solely by the cambial zone. The interposition of this tissue, which I will call the "muriform parenchyma," results in separating the woody layers from each other, and quickly interfering with the primitive symmetry of the organ. The spiral layers, carried away and twisted in every direction by the secondary ligneous lobes, quickly disappears, so that at a very short distance from the lower extremity of the tubercule it is already impossible to recognize them.

Higher up the muriform parenchyma which surrounds the indurated ligneous masses splits up parallel to the surface of these masses, and thus originate true secondary generating zones, which produce, on the side of the wood, some rows of muriform parenchyma, and, on the other side, secondary liber, with numerous glands containing resinous and crystalline matter.

In the most swollen parts are seen important layers of muriform parenchyma, divided tangentially in every direction, and furnishing, at the same time, liber products on the one side and parenchymatous elements on the other. All the parenchymatous cells are gorged with starch, and the tubercule constitutes an important alimentary reserve for the plant.

In studying the upper portion of the tubercule I have followed the reverse order, and starting from the upper extremity descended towards the centre.

The transverse section made at the top extremity of the tubercule shows that the organ, at this point, has the structure of a stem. The primary ligneous mass forms, in fact, an annular zone around the centre of the organ, but at a certain distance from the centre. It is formed of radiating layers grouped in badly defined bundles. Each layer of primary wood comprises three or four contiguous spiral vessels disposed radially, the most slender being inside. The differentiation of the primary ligneous elements, therefore, has proceeded from the centre of the development (indicated by the most slender spiral vessel) in a direction which passes by the centre of the organ, but which leaves the centre of development between the centre of the organ and the ligneous layer. The centre of the organ presents, therefore, a central crown of bundles with centrifugal differentiation. From this it may be concluded that the organ at this level is a stem.

Moreover, at the top of the cicatrices, to which I have referred before, is observed the issue of four bundles, in two opposite appendages on each side. At the axil of each of these appendages a bud that is frequently developed is placed between the two bundles in relation with the bundles of the stem. In the interval comprised between the point of issue of the appendages and the swollen middle portion of the tubercule occurs the extinction of the primary ligneous layers of the stem. The organ becomes tuberized in this region by the same process as in the inferior portion.

The extinction of the primary ligneous layers of the stem shows that there is here a lower termination of the principal stem. Therefore, the stem which forms the upper portion of the typical tubercules of jalap is a principal stem, its inferior appendages are cotyledons, and their axillary buds correspond to creeping branches.

The secondary elements of the stem are in direct continuation with the secondary elements of the root; from this it follows that the root which forms the lower end of the tubercule below is the principal root. The part comprised between the points where the cotyledons issue and the point of insertion of the principal root corresponds therefore to the hypocotyledonous axis.

This investigation allows of the conclusion that the typical tubercules of jalap represent the stock of the convolvulaceous plants which produce them, and that the tuberized portion corresponds to hypertrophy: (*a*) of the base of the principal stem; (*b*) of the hypocotyledonous base; (*c*) of the region of insertion of the principal root upon the hypocotyledonous axis; and (*d*) of the upper part of the principal root.

I have studied in the same manner the various tubercules of jalap that never present the remains of aerial organs at one of their extremities, and I have in this way recognized that—

(1) Most of the varieties of tubercules represent tuberized roots of different orders;

(2) Some tubercules represent subterranean stems, which, having to play the same physiological *rôle* as the radical tubercules, are tuberized by the same process and present a nearly identical structure.

Finally, comparison of the three commercial kinds has shown me, that in respect of structure there is no difference, however slight, between the different kinds of true jalap.

From the materia medica point of view, the jalaps are therefore principally formed of tubercules which correspond to the stocks of the convolvulaceous plants that produce them; they include, besides, a certain number of tubercules which represent tuberized roots of different orders; lastly, tubercules are met with derived from tuberized subterraneous stems.

I will now add some pharmaceutical observations upon jalap and the resin extracted from it.

In none of the published analyses of jalap is

mention made of oxalate of lime, but a microscopic examination and microchemic tests detect it in considerable proportion in the tubercules.

I am unable to accept the opinion of M. Andouard, according to which the small roots of jalap would be generally more rich in resin than the large tubercules from the same plant. This does not agree with what is revealed by the microscopic investigation, and, moreover, is not in accord with the amounts found by M. Guibourt. Would not M. Andouard consider as "small roots" the slightly tuberized fragments which are met with in the *débris*, which are derived from subterranean stems and which in fact contain much resin?

With the object of adding something new to the results already known, I have extracted the resin, by the Codex process, from nine specimens of jalap. In order to utilize the products of the aqueous macerations involved in this process, I prepared extracts evaporated in a water-bath to a pilular consistence, of which I have given the yield.

	Resin dried at 100°. Per cent.	Aqueous Extract. Per cent.
I. Type Specimens of Jalap.		
Supplied by the *Pharmacie Centrale.*		
Tuberous or Official Jalap	12·5	38
Light Jalap (small specimens)	2·0	35
Digitate Major Jalap	7·0	12
Digitate Minor Jalap	9·0	11·5
II. Picked Commercial Jalap.		
No. 1	12·5	35
No. 2	10·5	33
No. 3	7·5	23
No. 4	8·0	17
III. Débris	8·5	27

It follows from the investigations of different authors that jalap owes its purgative properties to two homologous resinous glucosides, convolvulin and jalapin. I have, however, nowhere met with mention of clinical experiments made with the pure glucosides. Might there not be, if not an alkaloid, as alleged by Hume, at least a principle other than the resinous glucosides, and which has hitherto escaped analysis? If the opinion of Le Maout and Decaisne is to be accepted (*Traité général de Botanique*) the resin of the Convolvulaceæ owes its purgative properties only to the aroma which accompanies it, for the rhizomes lose them when powdered and exposed for a long time to the air, although they preserve the purely resinous principle. The odorous oleaginous substance which floats at the top towards the end of the distillation, when nearly all the alcohol is removed from the tincture of jalap from which it is desired to extract the resin, would deserve attention from this point of view.

When jalap resin is prepared by the Codex process, and, in following the mode of operation prescribed, the residue from the distillation of the alcoholic liquor is poured into boiling water, the resin precipitated agglomerates under the form of a thick turpentine, which adheres strongly to the sides of the vessel and can only be collected completely with great difficulty. I have found that if, on the contrary, the residue from the distillation be poured into well-cooled water, the precipitated resin will remain on the sides of the vessel in a very divided form; the resinous particles are separated one from another by drops of water, and it is very easy to collect the product with the aid of a flexible spatula. Upon placing all the resin together in a small capsule the water gradually floats to the top whilst the resinous particles agglutinate.

Finally, I have compared, in respect to yield, the Codex process, which gives an odorous greenish-brown resin, and M. Nativelle's process, which gives an inodorous resin, as white as starch. The following are the results I have obtained:—

	Codex process.		Nativelle's process.	
	Resin.	Extract.	Resin.	Extract.
No. 1	7	11·5	3·0	9·0
No. 2	12·5	33·0	6·0	27·0
No. 3	7·5	23·0	3·3	17·0

This enormous difference in the yield of resin is due to the use of 65° alcohol, as recommended by M. Nativelle, which does not dissolve all the resin removed by 90° alcohol, as ordered in the Codex.

It is worthy of notice that more aqueous extract was obtained in evaporating the products of the macerations yielded by the Codex process than in evaporating the products of the decoctions necessitated in following the process of M. Nativelle.

REPORT UPON THE CREASOTE IMPURITIES OCCURRING IN THE AMERICAN MARKET.*

BY PROFESSOR P. W. BEDFORD.

The object of this query can be but one, namely: to inquire whether the wood creasote offered for sale is a pure article, or not; and if not, what is the impurity present?

The relative commercial value of the articles sold as coal tar creasote and wood creasote disposes of the question as to the latter being present in the former article, and we are quite certain that the cheap variety is nothing more or less than a phenol or carbolic acid. Wood creasote, it has been frequently stated, is adulterated with coal tar creasote, or phenol. The object of my experiments has been to prove the identity of wood creasote, and its freedom from phenol. The following tests are laid down in various works as conclusive evidence of its purity, and each has been fully tried with the several samples of wood creasote to prove their identity and purity, and also with phenol, sold as commercial creasote or coal tar creasote, and for comparison with mixtures of the two, that even small percentages of admixture might be identified should such exist in the wood creasote of the market.

The following tests were used:—

1. Equal volumes of anhydrous glycerine and wood creasote make a turbid mixture, separating on standing. *Phenol dissolves.* If three volumes of water be added, the separation of the wood creasote is immediate. *Phenol remains in permanent solution.*

2. One volume of wood creasote added to 2 volumes of glycerine: the former is not dissolved, but separates on standing. *Phenol dissolves.*

3. Three parts of a mixture containing 75 per cent. of glycerine and 25 of water to 1 part of wood creasote shows no increase of volume of glycerine, and wood creasote separates. *Phenol dissolves and forms a clear mixture.* Were any phenol present in the wood creasote, the increase in the volume of the glycerine solution, if in a graduated tube, would distinctly indicate the percentage of phenol present.

4. Solubility in benzine. Wood creasote entirely soluble. *Phenol is insoluble.*

5. A 1 per cent. solution of wood creasote. Take of this 10 cubic centimetres, add 1 drop of a test solution of ferric chloride; an evanescent blue colour is formed passing quickly into a red colour. *Phenol gives a permanent blue colour.*

6. Collodion or albumen with an equal bulk of wood

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

creasote makes a perfect mixture without coagulation. *Phenol at once coagulates into a more or less firm mass or clot.*

7. Bromine solution with wood creasote gives a reddish brown precipitate. *Phenol gives a white precipitate.*

All tests enumerated above were repeatedly tried with four samples of wood creasote sold as such; one a sample of Morson's, one of Merck's, one evidently of German origin, but bearing the label and capsule of an American manufacturer, and one of unknown origin, but sold as beechwood creasote, German, and each proved to be *pure wood creasote.*

Two samples of commercial creasote which, from the low cost were known to be of coal tar origin, gave the negative tests, showing that they were phenol.

Corroborative experiments were made by mixing 10 to 20 per cent. of phenol with samples of the beechwood creasote, but in every case, each of the tests named showed the presence of the phenol.

The writer on other occasions applied single tests (the collodion test) to samples of beechwood creasote that he had an opportunity of procuring small specimens of, and satisfied himself that they were pure. The conclusion is that the wood creasote of the market of the present time is in abundant supply, is of unexceptionable quality, and reasonable in price, so that there is no excuse for the substitution of the phenol commonly sold for it. When it is directed for use for internal administration (the medicinal effect being entirely dissimilar) wood creasote only should be dispensed.

The general sales of creasote by the pharmacist are in small quantities as a toothache remedy, and phenol has the power of coagulating albumen which effectually relieves the suffering. Wood creasote does not coagulate albumen, and is, therefore, not as serviceable. This is, perhaps, the reason that it has become, in a great measure, supplanted in general sale by the coal tar creasote, to say nothing of the argument of a lower cost.

FERRATED ALBUMEN.*

BY GEORGE BUCHNER, OF MUNICH.

From the author's investigations and observations on compounds of ferric chloride with albumen we make the following abstracts:—

The amount of chloride in egg albumen was determined by ignition with sodium carbonate and titration with nitrate of silver; 1·6 per cent. Cl was found. The chlorine of the compound was determined in the same manner, deducting the chlorine of the albumen. The iron was estimated by ignition, dissolving in hydrochloric acid, reduction to ferrous salt by zinc, and titration by potassium permanganate.

1. Solution of ferric chloride (1 : 20) was added to a filtered solution of albumen (1 : 10) until the voluminous yellowish-brown precipitate was just dissolved. In the clear red-brown liquid albumen as well as ferric chloride responded to the usual reagents. On evaporating this liquid at a temperature not exceeding 50° C. and drying the gelatinous mass at the same temperature, a dark-brown powder or transparent brown-red scales were obtained, only partly soluble in water, the insoluble portion becoming transparent and gelatinous. Analysis: Fe 2·193, Cl 7·980, albumen 89·827 = Fe_2Cl_6 6·354, excess of Cl 3·819.

2. The preceding product was thoroughly washed with water and the residue dried at 50° C. Analysis: Fe 1·488, Cl 2·700, albumen 95·812 = 4·119 Fe_2Cl_6, excess of iron as $Fe_2(OH)_6$ 0·131.

3. On slowly evaporating the original ferrated albumen solution the liquid becomes turbid, separating a thick jelly, which is soluble in warm water, yielding a clear solution which is not precipitated by boiling. The jelly, well drained, pressed and thoroughly dried over sulphuric acid, yielded Fe 0·998, Cl 4·531, albumen 94·471 = Fe_2Cl_6 2·895, excess of Cl 2·634. The powder was completely soluble in water and the solution was not disturbed by boiling or by alkalies; acids caused a precipitate of albumen, while sodium chloride and potassium sulphocyanide precipitated ferrated albumen.

4. The original ferrated albumen solution was completely precipitated by a saturated solution of table salt; the precipitate was collected upon a filter, drained, pressed, the press cake rapidly washed by agitation with water and decantation, again pressed between bibulous paper and dried over sulphuric acid. The powder swells with water, and dissolves after some time to a solution which is not disturbed by silver nitrate, but is precipitated by potassium sulphocyanide; its composition is Fe 1·703, Cl 1·680, albumen 96·617 = Fe_2Cl_6 2·563, excess of iron as $Fe_2(OH)_6$ 1·566.

5. The original solution of ferrated albumen was mixed with excess of ferric chloride and precipitated by table salt; treated as before, the powder contained Fe 1·15, Cl 1·78, albumen 97·07 = Fe_2Cl_6 2·175, excess of iron as $Fe_2(OH)_6$ 0·41. It behaved to reagents like the preceding. Both, if left in prolonged contact with water while being washed, become transparent, gelatinous and then dissolve.

6. The original solution yields with excess of ferric chloride, on standing, a precipitate which, treated as before, gave a powder containing Fe 1·25, Cl 4·48, albumen 94·27 = Fe_2Cl_6 3·627, excess of Cl 2·103.

7. The original ferrated albumen solution was dialysed, the water being renewed until silver nitrate ceased to give a reaction. The contents of the dialyser had a neutral reaction and could be readily filtered. The liquid was not disturbed by boiling, by alcohol, caustic alkalies, carbonic acid gas, or silver nitrate. It was coloured violet-blue by tannin, and green, without precipitate, by ammonium sulphydrate. Nitric and hydrochloric acid caused a precipitate of albumen, the solution being yellow; lime-water a brownish-yellow precipitate; potassium ferrocyanide a bluish-green precipitate, turning dark-blue on the addition of hydrochloric acid; potassium ferridcyanide a green precipitate not altered by hydrochloric acid; potassium sulphocyanide a yellowish-brown precipitate, the solution becoming deep red on the addition of hydrochloric acid; sodium chloride a light yellowish-brown precipitate.

The liquid, evaporated at a moderate heat, yielded brown-red, nearly tasteless scales, which retained their solubility in water, the solution on being kept for a year becoming slightly mouldy, but not putrid. The scales contained Fe 1·1715, Cl 0·510, albumen 97·775 = Fe_2Cl_6 0·778, excess of iron as $Fe_2(OH)_6$ 2·765.

It is obvious from the foregoing that these products are readily altered and cannot be of uniform composition unless obtained under precisely identical conditions of temperature, dilution, action of water, etc. It is remarkable that with the entrance of $Fe_2(OH)_6$ into the compound these products become soluble in water and non-coagulable by heat, properties which, together with the peculiar behaviour to reagents, are best observed in the dialysed product, and result from a relatively small amount of iron. The difficulties of studying the nature of such products are increased by the uncertainty of determining the water without altering the composition, and of ascertaining whether definite compounds or mixtures of such are under investigation.

The formation of iron-albuminates may be used for proving the presence of albumen. A very diluted solution of albumen, which is scarcely rendered opalescent by boiling, if mixed with a saturated solution of table salt, yields on the addition of a little ferric chloride, near the point of contact a yellowish-white zone, and on agitation, at first a dense turbidity, changing, after a while to a rather voluminous precipitate.

* From the *Archiv d. Pharmacie*, June, 1882, pp. 417—425. Reprinted from the *American Journal of Pharmacy*, October, 1882.

On digesting iron in solution of albumen for a few days a yellowish-brown liquid is obtained, which on evaporation at a moderate heat yields light brownish-red scales, similar in behaviour to the dialysed ferrated albumen; in two cases 1·2 and 2 per cent. of iron was obtained. Freshly precipitated ferric hydroxide dissolves in albumen; the dry product contained 0·65 Fe = 1·24 $Fe_2(OH)_6$. Ferrous hydroxide is very slightly soluble in albumen.

INFLUENCE OF PEPTONES AND CERTAIN INORGANIC SALTS ON THE DIASTATIC ACTION OF SALIVA.*

BY R. H. CHITTENDEN AND J. S. ELY.

(*Continued from page* 368.)

The increased diastatic action of the saliva in the presence of the peptones is made more plainly apparent by the following table, in which are given the percentage amounts of starch converted into sugar; calling the sugar $C_6H_{12}O_6$ and the starch $C_6H_{10}O_5$.

	Without peptones.	With peptones.
1.	41·01 per cent.	44·03 per cent.
2.	41·69 ,,	44·58 ,,
3.	41·88 ,,	47·83 ,,
4.	41·38 ,,	44·72 ,,
5.	39·13 ,,	42·89 ,,
6.	38·22 ,,	43·43 ,,

It is thus seen that the presence of 1 per cent. of peptones causes an increased conversion of starch into sugar, amounting on an average to 4 per cent.

Similar experiments made with glycogen yielded like results. Two grams of pure dried glycogen, prepared from *Pecten Irradians*,† were employed in each experiment, and the digestions continued for thirty minutes. One gram of peptones was used as before.

	Without peptones.		With peptones.	
	Wt. Cu in one-tenth. Gram.	Total amount of sugar. Gram.	Wt. Cu in one-tenth. Gram.	Total amount of sugar. Gram.
1.	0·1405	0·7297	0·1477	0·7671
2.	0·1286	0·6581	0·1386	0·7144
3.	0·1300	0·6653	0·1328	0·6771
4.	0·1281	0·6556	0·1306	0·6684

A few experiments were then tried, both with glycogen and starch, using 2 grams of peptones. Following are the results:—

	Without peptones. Wt. Cu in one-tenth.	With 1 grm. peptones. Wt. Cu in one-tenth.	With 2 grms. peptones. Wt. Cu in one-tenth.
Starch .	0·0835 gm.	0·0949 gm.	0·0960 gm.
Glycogen	0·1405 ,,	0·1477 ,,	0·1472 ,,
,,	0·1286 ,,	0·1386 ,,	0·1429 ,,
,,	0·1300 ,,	0·1328 ,,	0·1362 ,,

Here it is to be noticed that the presence of 2 per cent. of peptones has but little additional influence on the diastatic action. That peptones themselves were entirely free from carbohydrate matter and that the saliva is wholly without action on the peptones was clearly shown by digesting 2 grams of peptones with 25 c.c. of saliva. This experiment was repeated twice, but in neither case was any reduction obtained on boiling the diluted fluid with Fehling's solution. Again, the possibility suggested itself that the peptones might exercise some influence on the precipitation of the copper, and that the increase of copper obtained when peptones were present was due not to any stimulating action they might exert on the ferment, but to a precipitation or reduction of the copper. In order to settle this point three digestions were made in the usual manner with 2 grams of glycogen. No. 1 contained, in addition, 2 grams of peptones. No. 2 had added to it after the destruction of the ferment by boiling, 2 grams of peptones, while No. 3 served as a control. A determination of the amount of sugar in the aliquoted fluids gave the following results, clearly showing that the mere presence of the peptones has no influence on the precipitation of the copper:—

No. 1. Wt. Cu in one-tenth.	No. 2. Wt. Cu in one-tenth.	No. 3. Wt. Cu in one-tenth.
0·1472 gram.	0·1403 gram.	0·1405 gram.

There still remained two possible chances of error, viz., the possibility of the peptones containing a trace of a diastatic ferment, or of their possessing a diastatic action, and secondly, that the slightly acid reaction of the peptone solution might exert some modifying influence. The former supposition was easily disproved by making a digestion of starch and peptones alone. This led, as would naturally be expected, to a negative result; the solution showing no reducing action whatever. An endeavour was then made to obtain the same result in a somewhat different manner: a series of digestions was made, in which one of the peptone solutions was vigorously boiled before being added to the starch solution, the digestions then being made in the usual manner.

	Without peptones. Wt. Cu in one-tenth. Gram.	With 1 grm. peptones. Wt. Cu in one tenth. Gram.	Peptone sol. boiled. Wt. Cu in one-tenth. Gram.	Peptone sol. boiled and water replaced. Wt. Cu in one-tenth. Gram.
No. 1.	0·0856	0·0937	0·0950	0·0952
No. 2.	0·0904	0·0977	0·1035	—

That the peptones contain no ferment is plainly apparent, but the slight increase of sugar when the peptone solution is boiled is certainly somewhat singular. Three of the peptones employed in these experiments gave, when dissolved in water, very faintly acid solutions. The acidity of 1 gram of peptones, however, was never sufficient to neutralize the alkali of 25 c.c. of saliva.* The fourth sample, which was purified by dialysis, gave a neutral solution, and this sample did not differ in its action in the least from the other three. An attempt was made, however, to neutralize one of the peptone solutions, previous to the digestion, by the use of an exceedingly dilute alkali. The following results were obtained:—

Without peptones. Wt. Cu in one-tenth.	With 1 grm. peptones. Wt. Cu in one-tenth.	With 1 grm. neutralized peptones. Wt. Cu in one-tenth.
0·0915 grm.	0·1045 grm.	0·0991 grm.

The slight decrease of copper in the neutralized peptone, as later experiments would seem to indicate, is due probably to the retarding influence of the alkali salt formed by neutralization, although it seems hardly possible that such a minute trace could exert any influence whatever on the action of the saliva.

O. Nasse,† in his work on unformed ferments, found that in 4 per cent. solutions of certain inorganic salts there was an increased ferment action. It therefore seemed desirable to ascertain in the present case whether the inorganic salts contained in the peptones could exert any influence on the salivary ferment. The four samples of peptones contained the following percentages of ash:—

No. 1.	No. 2.	No. 3.	No. 4.
1·71 per cent.	0·89 per cent.	1·25 per cent.	1·58 per cent.

With the exception of No. 4 the ash was composed of sodium chloride, sodium phosphate, and calcium phosphate.

No. 4, which was prepared from coagulated albumin and purified by dialysis, left an ash composed wholly of calcium phosphate. The following results show the individual influence of the three inorganic salts on the dias-

* From the *American Chemical Journal.*

† Chittenden, *American Journal of Science and Arts*, x., 26.

* Neutral saliva appears to have as great a diastatic action as saliva of normal alkalinity. Thus while a digestion made with freshly collected alkaline saliva gave 0·0905 gram Cu, a portion of the same saliva neutralized gave 0·0943 gram Cu under the same conditions.

† *Untersuchungen über die ungeformten Fermenten*, Pflüger's *Archiv*, xi., 138.

tatic action of saliva when present in the digestive fluid in approximately such percentages as the peptones give when added to the starch and saliva mixture:—

First Experiment.

		Wt. Cu in one-tenth. Gram.
Saliva and starch alone		0·0872
„ „	+0·012 grm. NaCl = 0·012 p. c.	0·0862
„ „	+0·024 „ „ = 0·024 „	0·0925
„ „	+0·012 „ Na_2HPO_4 = 0·012 „	0·0886
„ „	+0·024 „ „ = 0·024 „	0·0834

Second Experiment.

		Wt. Cu in one-tenth. Gram.
Saliva and starch alone		0·0844
„ „	+0·015 grm. $CaHPO_4$ = 0·015 p. c.	0·0839
„ „	+0·030 „ „ = 0·030 „	0·0870

From these results it is apparent that no one of the inorganic salts in the peptones is present in sufficient quantity to have any stimulating action whatever in aqueous solution, for increased diastatic action is noticed only in the presence of 24 milligrams of sodium chloride, an amount much larger than the total ash of 1 gram of peptones. Again, peptone No. 4, which was freed from all trace of chloride by dialysis, had exactly the same stimulating effect as the other samples.

In order to ascertain exactly what the influence of the *mixture* of inorganic salts, as present in the peptones, would be, a series of digestions was made, in two of which the ash of 1 gram and of 2 grams of peptones respectively was employed; the ash, as in the experiments with the peptones themselves, being dissolved in 50 c.c. of water, and in this manner added to the starch solution previous to the addition of the 25 c.c. of saliva. The peptones employed were the ones which contained 1·71 per cent. of ash; thus the digestive mixtures contained respectively 0·017 and 0·034 per cent. of inorganic matter. The following results were obtained:—

Saliva and starch alone. Wt. Cu in one-tenth.	With ash from 1 gram peptones. Wt. Cu in one-tenth.	With ash from 2 grams peptones. Wt. Cu in one-tenth.
0·0862 gram.	0·0851 gram.	0·0715 gram.

It is thus very apparent that the stimulating action of the peptones is not due to the inorganic salts contained in them, for these latter, as the foregoing experiment shows, have, by themselves, in aqueous solution, a retarding influence. We therefore deem it proven that peptones under such conditions as have already been described have in aqueous solution a stimulating influence on salivary digestion. In other words, peptones when present to the extent of 1·2 per cent. cause, under the same conditions as saliva alone, an increased conversion of starch into sugar, amounting on a average to 4 per cent.

Influence of Peptones in Acid Solution.

Previous experiments* have plainly demonstrated the extreme sensitiveness of the saliva to the action of dilute acids. Thus the addition of 50 c.c. of 0·05 per cent. hydrochloric acid to a digestive mixture, thereby making the fluid contain but 0·025 per cent. of acid, very greatly diminishes the diastatic action. This result has been recently verified by J. N. Langley,† as also the results of Chittenden and Griswold in regard to the destruction of the salivary ferment by gastric juice and by 0·2 per cent. hydrochloric acid at 40° C.

An attempt was now made to ascertain the influence of peptones in an acid solution of the above strength, viz., 0·025 per cent. The experiments were conducted in the same manner as the preceding, with this exception: the peptones, instead of being dissolved in water, were in each case dissolved in 50 c.c. of 0·05 per cent. hydrochloric acid. One gram of peptones was used in each experiment, starch being the amylaceous material employed.

	Saliva alone.		Saliva and acid.		Saliva, acid, and peptones.	
	Wt. Cu in one-tenth. Gram	Total amount of sugar. Gram	Wt. Cu in one-tenth. Gram	Total amount of sugar. Gram	Wt. Cu in one-tenth. Gram	Total amount of sugar. Gram
1.	0·0896	0·4557	0·0076	0·0389	0·1068	0·5428
2.	0·0911	0·4633	0·0079	0·0405	0·1070	0·5439
3.	0·0915	0·4654	0·0098	0·0502	0·1060	0·5388
4.	0·0835	0·4247	—	—	0·0985	0·5010

The percentage amounts of starch converted into sugar under the three conditions are as follows:—

	Saliva alone	Saliva and acid.	Saliva, acid, and peptones.
1.	41·01 per cent.	3·50 per cent.	48·85 per cent.
2.	41·69 „	3·64 „	48·95 „
3.	41·88 „	4·51 „	48·48 „
4.	38·22 „	—	45·09 „

Similar experiments were tried with glycogen, 2 grams of this substance being dissolved in 25 c.c. of water and employed in the same manner as the starch; 1 gram of peptones was used as before. The following results were obtained.—

	Saliva alone. Wt. Cu in one-tenth.	Saliva and acid Wt. Cu in one-tenth.	Saliva, acid, and peptones. Wt. Cu in one-tenth.
1.	0·1300 gram	0·0049 gram	0·1408 gram
2.	0·1281 „	trace	0·1424 „

It is thus seen that the presence of 1 gram of peptones exercises a very remarkable influence on the diastatic action of saliva in an acid solution of the above strength. The peptones are present in the digestive mixture to the extent of only 1 per cent., while the acid is but 0·025 per cent., yet this quantity of peptones is sufficient not only to counteract the retarding influence of the acid, but increases the conversion of the starch to the extent of 7 per cent. above the action of the saliva alone. Increasing the amount of peptones to 2 per cent. does not appear to have any effect whatever, as the following results show:—

	1 gram peptones and 0·025 per cent. acid Wt. Cu in one-tenth.	2 grams peptones and 0·025 per cent. acid. Wt. Cu in one-tenth.
1.	0·1060 gram.	0·1984 gram.
2.	0·0985 „	0·0974 „

In acid solutions of increased strength the peptones appear to exercise but slight if any influence; thus when the solution contained 0·1 per cent. hydrochloric acid, no diastatic action at all was observed, even in the presence of the peptones. In 0·05 per cent. acid solution, however, one-tenth of the diluted and mixed digestive fluid yielded 0·013 gram Cu, showing a slightly increased action over and above what the acid fluid alone would give.

Control experiments with saliva, peptones, and acid without starch yielded negative results, thus showing that the saliva is entirely without action on the peptones in an acid solution of the above strength. Again, digestions of starch, peptones, and acid without saliva also gave negative results, proving that the peptones are wholly without diastatic action in the acid fluid. We deemed it advisable next to examine how far inorganic salts could influence the action of the ferment in an acid solution of the strength used. In aqueous solution it will be remembered the inorganic salts experimented with had but little or no action. In the acid solution the salts used were the same as before, viz., those present in the ash of the peptones. The experiments were conducted in the same manner as the preceding; 100 c.c. being the volume of the mixed fluid, of which 25 c.c. were filtered saliva, 25 c.c. water containing 1 gram of starch, and 50 c.c. 0·05 per cent. hydrochloric acid containing the salt.

(*To be continued.*)

* Chittenden and Griswold, *American Chemical Journal*, iii., 313.

† Foster's *Journal of Physiology*, iii., 246.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before 30th December next.

Those marked (*) are Pharmaceutical Chemists.

Abbott, Joseph ..... 1, Bellevue, Clevedon.
Abraham, William ..... 16, Lawford Road, Rugby, Warwickshire.
Adams, Henry Gardiner ..... 35, Burgate Street, Canterbury.
Alexander, William ..... Strichen, Aberdeenshire.
*Andrews, William Leatham .. 19, The Terrace, Peckham Road, London, S.E.
Armstrong, Brooksbank ..... 71, King's Road, Chelsea, London, S.W.
Arnold, George James ..... 17, Hardwick Place, Commercial Road, London, E.
Ashmore, George Johnson..... Lindsworth, King's Heath, Birmingham.
Atkinson, Edward Fenton..... 42, Kirkstall Road, Leeds.
Attwater, Thomas Chipping .... 47, Kerr Street, Devonport.
Atwell, Benjamin Arthur ..... Wincanton.

*Bachelot, Pierre Eloy ..... Paris.
Baker, Arthur George..... 98, Hampstead Rd., London, N.W.
Ballinger, Arthur John ..... 21, St. Alban's Street, Kennington Road, London, S.E.
Barnes, Benjamin ..... 7, Cross Street, Hatton Garden, London, E.C.
Barry, Henry ..... 79, High Street East, Sunderland.
Beesley, Thomas ..... 10, High Street, Salisbury.
Bell, George ..... 65, Hopwood Street, Spring Bank, Hull.
Bendelack, Charles ..... 112, High Street, Southampton.
Berry, Robert Innes ..... 65, St. Nicolas Street, Aberdeen.
Best, Robert ..... 33, Strickland Street, Hessle Road, Hull.
Betts, John Howe ..... 7, Bedford Row, Limerick.
Billsborough, Thomas..... 23, London Road, Preston, Lancs.
Bingham, Samuel..... Eton.
Birchall, Samuel ..... 39, Tennyson Place, Otley Road, Bradford.
Birrell, George ..... Post Office, Highgate, London, N.
Black, William Jones ..... 21, High Street, Bangor.
Bluett, Reginald ..... Tetbury, Gloucestershire.
Boe, James..... 43, Blackett Street, Newcastle-on-Tyne.
Bond, Alfred ..... 13, Pelham Road, High Road, Tottenham, London, N.
Boor, Jonathan ..... 38, East Street, Brighton.
Booth, Jonathan ..... 6, Cavendish Terrace, West Hill Park, Halifax, Yorks.
Boulton, Joseph Oakwell ..... Albert House, Claremont Street, Bristol.
Branch, George..... 26, St. Peter's Street, Mile End, London, E.
Branson, Alice ..... 7, Back Lane, Bradford, Yorks.
Breton, Harvey Wolstenholme.. 29, Loseby Lane, Leicester.
Brierley, John ..... Barrow-in-Furness.
Bristow, Robert Anthony ..... 47, Eastlake Road, Brixton, London, S.W.
Britten, John ..... 272, Albany Road, Camberwell, London, S.E.
Brown, Benjamin ..... 6, Russell Street, Hull.
*Brown, William Braithwaite .. Kibworth-Beauchamp, Leicestershire.
Buchanan, Robert ..... 5, Wellington Arcade, Glasgow.
Burt, James ..... Harrogate.
Burton, Shadrach..... 10A, High Cross Street, Leicester.
Burton, William ..... 37, High Street, Redcar, Yorks.
*Buzzard, Thomas Hardy ..... Market Place, Leicester.

Campbell, James ..... 127, Main Street, Anderston, Glasgow.
Campbell, John..... 4, Portland Street, Glasgow.
Cant, Hemington ..... 8, Coborn Street, Bow Road, London, E.
Capner, William Morgan ..... Highgate, London, N.
Carter, Frederick Lewis..... Canterbury.
Carter, William Robinson ..... 13, Renfrew Road, Lower Kennington Lane, London, S.E.
Caswell, Edmund..... Avenue Road, Leamington, Warwickshire.
Chalmers, William ..... 12, Glassford Street, Glasgow.
Chantry, Elizabeth ..... Aire Street, Goole, Yorks.
Chirm, John ..... 23, Guildford Terrace, Guildford Street, Birmingham.
Christian, George..... Godalming, Surrey.
Churchman, James ..... 123, Brixton Road, London, S.W.
Clarke, Thomas ..... 36, Conway Street, Birkenhead, Cheshire.
Clayton, George Pearson ..... Rose Cottage, Hall Bower, Huddersfield.
*Clayton, Henry ..... 5, Amersham Park Terrace, Amersham Road, New Cross, Kent.
Clode, Charles ..... 5, Lordship Terrace, Tottenham, Middlesex.
Cocking Thomas ..... Holbeach.
*Coleman Alfred ..... 13, St. Mary-at-Hill, London, E.C.
Conway, John William ..... 23, Regent Street, Leamington.
Cook, Charles ..... 120, Alston Street, Ladywood, Birmingham.
Coomber, Sarah ..... 85, Hollydale Road, Queen's Road, Peckham, London, S.E.
Cooper, James Newberry ..... Woodville House, White Ladies Road, Bristol.
Cope, Charles Ball ..... 96, Rock Street, Sheffield.
Corfe, Henry..... 4, Jewry Street, Winchester.
Cork, Charles Sawyer..... Hadleigh, Suffolk.
Court, Alfred..... 35, Bull Street, Birmingham.
Cowper, David Burgess..... 127, Main Street, Anderston, Glasgow.
Crane, John ..... 2, Louis Street, New Leeds, Yorks.
Crane, Walter ..... 91, Lower Marsh, Lambeth, London, S.E.
Crawley, Henry ..... 19, Phœnix Street, London, N.W.
Crook, Edward..... 41, Canterbury Road, Brixton, London, S.W.
Crooke, Charles Gibbins..... 82, Barkham Terrace, Lambeth, London, S.E.
Cross, John..... 12, Belle Vue Road, Upper Tooting, Surrey.
Cross, Thomas ..... 448, Duke Street, Glasgow.
Cunningham, William..... 35, Elizabeth Street, Bradford, Yorks.
Currie, Alexander ..... 24, Argyle Place, Edinburgh.

Dakeyne, Thomas Edward .... Wincle, Cheshire.
Davies, Charles ..... Newton House, Newton Street, Pennywell Road, Bristol.
Davies, Thomas ..... 5, Baker Street, Aberystwith, Cardiganshire.
Deane, Maurice Bumstead .... High Street, Dawley, Salop.
Defriez, Richard ..... 92, Packington Street, Islington, London, N.
Delamar, Edward Thomas .... 14, Albert Street, Leith Walk, Edinburgh.
Dickinson, Joshua Steel..... 1, Union Street, Jarrow-on-Tyne.
Dixon, William Bunting ..... 2, Loxton Street, Bloomsbury, Birmingham.
Dodridge, Samuel Henry Stephens ..... 180, Shoreditch, London, E.
Downes, Foster Donald..... 45, Ellerslie Road, Loftus Road, Shepherd's Bush, London, W.
Dowsett, Arthur ..... 16, North Street, Brighton.
Duckers, Henry ..... Cheshire Street, Market Drayton, Salop.
Duncan, James..... 57, Castle Street, Aberdeen.
Dunn, Edward ..... 16, Newgate Street, London, E.C.

Eastes, Benjamin Henley .... Burleigh House, Stanstead, Essex
Edwards, Charles Richard .... 5, West Place, Fareham, Hants.
Ellison, John Clement ..... 40, Brunswick Square, London, W.C.
Evans, David Powell ..... 8, Battersea Park Road, London, S.W.
*Evans, William Henry ..... 87, Westbourne Street, Eaton Square, London, S.W.
Evatt, Henry Royle ..... 32, Sweet Street, Holbeck, Leeds,

*Fairbarn, George ..... 2, Fairy Lane, Bury New Road, Manchester.
Farr, Archer ..... 10, Tillotson Place, Waterloo Road, London, S.E.
Field, Alfred William ..... 39, South Clerk St., Edinburgh.
Field, Henry ..... 133, Oxford Street, London, W.
Finch, Henry ..... 1, Keynsham Street, Cheltenham.
Fitness, Henry Robert ..... Oughtibridge, Sheffield.
*Fleetwood, Thomas ..... Widnes, Lancs.
Fleming, Ebenezer ..... 104, North Street, Glasgow.
Fleming, John ..... 27, Howard Street, Glasgow.
Forsyth, James ..... 53, Regent Quay, Aberdeen.
Foster, George Edward ..... Newbury, Berks.
Foster, William ..... 149, Kennington Cross, London, S.E.
Fox, John ..... 1, Spring Street, Sussex Gardens, London, W.
Fox, William ..... 51, Noble Street, Leicester.
Frank, John Mead ..... Dean Street, Newcastle-on-Tyne.
Freer, Thomas ..... 30, Bonners Lane, Leicester.
French, Mary Ann ..... 53, St. Peters Street, Islington, London, N.
Funnell, Edward ..... 22, Devonshire Place, Brighton.
Funnell, William Henry ..... 22, Devonshire Place, Brighton.

Gage, George ..... Luton, Beds.

Garside, Thomas	10, Cross Street. Southport.
Gell, George	6, Woodbine Place, Leeds.
George, Daniel	Hillside, Ebbw Vale, Monmouthshire.
Gethen, William	57, Linnell Road, Vestry Road, Camberwell, London, S.E.
*Gibbs, James	98, Elsey Road, Lavender Hill, Surrey.
Giddy, Anne	1, King Street, Twickenham, Middlesex.
Gilders, George Pollard	6, High Street, Maidstone.
Gilkerson, Watson	Market Place, Melton Mowbray.
Gill, Sutton Dudley	Maida Vale, London, W.
Gittings, Alfred	Birmingham Road, Oldbury.
Glasier, Samuel	21, Red Lion Street, Holborn, London, W.C.
Goddard, Benjamin	20, Sussex Road, Stockport, Cheshire.
Goodale, John Wallett	12, Cobden Street, Humberstone Road, Leicester.
Goodman, Godfrey	47, Jasmine Grove, Anerley, Surrey.
Goodwin, John	Muntz Street, Small Heath, Birmingham.
Goodyer, Frederick Richard	Sherwood Rise, Nottingham.
Grant, Robert	Aboyne, N.B.
Gray, Alexander	Bridge Place, Bonnington, Leith N.B.
Greenough, Isaac	1, Diamond Row, Stepney Green, London, E.
Griffin, George Henry	60, Deansgate, Bolton, Lancs.
Griffiths Joseph	8, Church Street, Wrexham.
Hambridge, Thomas	West Street, Reading.
Hancorne, Edward	9, East India Dock Road, Limehouse, London, E.
Hanson, Philip Freeman	Chagford, near Exeter, Devon.
Harding, George	High Street, Farningham, Kent.
Harries, Thomas	22, Page Street, Swansea.
Harris, Waddelow Chambers	170, Westgate, Bradford, Yorks.
Hawthorne, Charles Oliver	109, Chobham Road, Stratford, London, E.
Hayward, Charles William	54, Gartside Street, Manchester.
Healy, Patrick J.	25, Felstead Street, Victoria Park, London, E.
Heaps, William	16, Lime Street, Preston, Lancs.
Heaton, George	198, Manchester Road East, Little Hulton, near Bolton, Lancs.
Henderson, John	125, Gairbraid Street, Maryhill, Glasgow.
Heslop, John	South Shields.
Higgins, Joseph Slatterie	Clarence Cottage, St. John's, Fulham, London, S.W.
Hodsall, James	8, Lowfield Street, Dartford, Kent.
Hogg, Walter	3, Nesham Street, Westmoreland Road, Newcastle-on-Tyne.
Holland, Henry	97, Higate Lane, Sparkbrook, Birmingham.
Horner, James William	5A, Banyard Terrace, Banyard Road, Bermondsey, London, S.E.
Horsfall, Henry	31, Vicar Lane, Leeds.
Horsfall, Thomas	Burley Road, Leeds.
Howard, George	72, Rochdale Road, Manchester.
Howard, James Walker	39, Green Road, Leeds.
House, Henry William	28, Red Lion Square, London, W.C.
Huff, Evan	330, Ashton Old Road, Openshaw, Manchester.
Hunneman, Charles Julius	Hanover.
Hunter, William Bildad	42, Lansdowne Street, Hull.
Huntley, Henry Edwin	36, Heygate Street, Walworth, London, S.E.
Huskinson, John Lovett	Frodsham, Cheshire.
Huxtable, James	1 Wine Office Court, Fleet Street, London, E.C.
Ives, Robert Hanworth	Chapeltown Road, Leeds.
Jack, George	100, King Street, Dundee.
Jackson, Nathaniel	192, Rochdale Road, Manchester.
Jackson, Richard	High Street, Teddington.
Jackson, William Kilvington	Horton, near Belford, Northumberland.
James, Abel	69, Oxford Street, Mountain Ash, Glamorganshire.
James, John	Pontypridd, Glamorganshire.
Jenkins, John	Church Street, Tredegar, Mon.
Jessop, John Arthur	Market Place, Willenhall, Staffs.
Jessop, Josiah Benjamin	12, Darlington Street, Wolverhampton.
Johnson, Edward	22, Pimblett Street, Cheetham, Manchester.
Johnson, Edward	48, Stamford Street, Stalybridge.
Johnston, Robert	212, New City Road, Glasgow.
Jones, Henry William Burnell	64, High Street, Newport, Mon.
Joy, Josiah Rudduck	1, St. Joseph Street, Hunslet Road, Leeds.
Judd, Richard	110, Suffolk Street, Birmingham.
Keith, Alexander Reid	15, Princes Square, Kennington, London, S.E.
Kirby, John Henry	124, Wheeler Street, Birmingham.
Kirkman, Thomas Charles	20, Ellerby Lane, Bank, Leeds.
Knight, John	5, Chapel Street, Somers Town, London, N.W.
Lanchenick, Emma	High Street, Marlborough, Wilts.
Langford, William	119, London Road, Lynn, Norfolk.
Langridge, Thomas Benjamin	Maud Villa, Colworth Road, Leytonstone, Essex.
Lavender, Joseph	Frog Island, Leicester.
Lemmon, Charles	12, South Street, Worthing.
Leppard, James	Guildford Street, Chertsey, Surrey.
Levie, Alexander Mair	73, Wales Street, Aberdeen, N.B.
Lewis, Rebecca	Ebbw Vale, Mon.
Lickiss, Charles	55, Liddell Street, Hull.
Little, Henry	107, Broad Street, Reading.
Lodge, Arthur William	London Hospital, Whitechapel, London, E.
Lomas, Charles Benjamin	25, King Street, Leicester.
Longfield, Joshua	17, Whitehouse Road, Sunderland.
Lyddon, Richard	138, Mile End Road, London, E.
Lynch, Edwin Bould	25, Cheetham Street, Rochdale.
Lynch, Thomas Bold	9, London Road, Preston, Lancs.
McCheyne, James	45, High Street, Dumfries, N.B.
McConachy, John	Hagley Street, Halesowen, Birmingham.
McCulloch, Charles	6, Cross Lane, St. Mary-at-Hill, London, E.C.
MacFarlane, Peter	191, Fulham Road, London, S.W.
McGown, John Porter	11, Caledonia Street, Paisley, N.B.
McGruer, John	47, South Kinning Place, Paisley Road, Glasgow.
McKenzie, Hector	116, Castle Street, Montrose, N.B.
McKinnell, Thomas Maxwell	16, Brougham Place, Edinburgh.
Macneill, Archibald	324, Caledonian Road, London, N.
McOwan, John Townsend	1, Powlett Place, Harmood Street, Camden Town, London, N.W.
Mann, John	68, St. Ann's Road, Nottingham.
Marlow, Frederick William	11, High Street, Battersea Square, Battersea, London, S.W.
Marrion, William	Oxford Street, Oaken Gates, Salop.
Marsden, John	17, Barony Street, Edinburgh.
Marsh, Thomas	Elm Cottage, Slindon, near Arundel, Sussex.
Martin, Michael	142, Mill Street, Liverpool.
Melton, Frederick	22, Worship Street, London, E.C.
Merrett, Joseph Hughes	48, East Street, Brighton.
Miller, William Henry	62, Bean Street, Hull.
Millington, Edward	162, Bermondsey Street, London, S.E.
Mills, John Perry	The Cross, Exmouth, Devon.
Mills, Thomas William	8, Lowfield Street, Dartford, Kent.
Milne, James	Forrest Road, Edinburgh.
Morgan, John	13, Methley Street, Kennington, London, S.E.
Morgan, Richard Thomas	Brook House Dispensary, Cricklade, Wilts.
Morris, Alfred	32, Torriano Avenue, Camden Town, London, N.W.
Morris, Edwin	1, Spring Street, Hyde Park, London, W.
Morris, John	Duke Street, Wellington, Salop.
*Morris, Thomas Edmunds	15, Longfellow Street, Lodge Lane, Liverpool.
Morrison, William Hay	65, St. Nicholas Street, Aberdeen.
Motherwell, Mary	20, Orchard Street, Paisley, N.B.
Murch, Edward	18, Broad Street, South Molton, Devon.
Muskett, Edwin Burrell	Holt.
Needham, Jane	60, Church Gate, Leicester.
*Newhill, John William	Kirkheaton, near Huddersfield.
Newman, Samuel Charles	8, East Street, Bedminster, Bristol.
Nicholson, Edward	Lindley, near Huddersfield
Nisbet, William Johnstone	Curries Cottage, Spring Gardens, Edinburgh.
Noakes, Richard	64, Geneva Road, Brixton, London, S.W.
Noble, Alexander	62, Elderslie Street, Glasgow.
*Noel, Ferdinand	Paris.
Oldham, Gervase	17, Chestergate, Macclesfield.
*Oliver, William Hurdon	113, Holborn, London, E.C.
Osborn, William Henry	124, High Street. Tewkesbury.

Osbourne, Nicholas Twigg	25, Trinity Street, Spring Bank, Hull.
Owen, Charles	Portland Place, Derby Road, Bootle, near Liverpool.
Owen, Richard Lewis	Turf Square, Carnarvon.
Padley, William	5, Norfolk Street, Lynn.
Parker, Frederick Carr	Lady Bank Works, Dundee.
Parr, Frederick Richard	Silverdale, Staffs.
Patman, George	White Lion Street, Norwich.
Pattison, Frederick	38, St. Paul's Road, South Tranmere, Cheshire.
Peat, William Henry	The Crescent, Birmingham.
Pemberton, William	51, Tithebarn Street, Preston, Lancs.
Penketh, John	197, Westminster Road, Kirkdale, Liverpool.
Phillips, Charles	34, Montgomery Street, Sparkbrook, Birmingham.
Pickering, Samuel Whaley	The Lache, near Chester.
Pidgeon, Joshua David	Hatherleigh, Devon.
*Pisani, Orestes Victoriano	23, Ravensdon Street, Kennington, London, S.E.
*Place, William Thomas	17, Brunswick Terrace, Aire Street, Leeds.
Poate, Stephen	1, Charles Street, Landport, Hants.
Pollard, Jeremiah	43, Winchester Street, London, S.W.
Pollard, John Frederick	North Street, Milverton, Somerset.
Poole, John	20, Garratt Street, Manchester.
Powell, Thomas Quarton	32, Cordingley Street, Otley Road, Bradford, Yorks.
Pye, John	Duke Street, Dartmouth, Devon.
Raynes, Sydney Herbert	10, Woodsome Road, Highgate, London, N.
Reed, Johnson	47, Diana Street, Newcastle-on-Tyne.
Reed, Willliam	47, Diana Street, Newcastle-on-Tyne.
Reekie, Arthur	Loanhead, Mldlothian.
Reeve, James	Bell Hotel, Ely, Cambs.
Rennison, James	119, High Street, Sunderland.
Revell, John	11, Clifton Road, Maida Vale, London, W.
Richards, Frederick Johnson	60, Albion Road, Dalston, London, E.
Richards, Thomas	18, Saville Place, Lambeth Road, London, S.E.
Richardson, Joseph Hancock	3, Arundel Terrace, Cork.
Ring, Edward James	324, Caledonian Road, London, N
Roberts, Thomas	29, Rectory Road, Stoke Newington, London, N.
Roberts, Thomas Edwards	69, Beacon's Hill, Denbigh.
Robinson, George	27, Arlington Street, Salford, Manchester.
Robinson, Herbert	52, Royal York Crescent, Clifton, Bristol.
Robinson, John	15, Wellington Terrace, Norwood, Beverley.
Robinson, Thomas	Easington, Yorks.
Roper, George Arthur	4, Summerfield Terrace, Newnham, Cambs.
Routlidge, George	362, Rochdale Road, Manchester.
Salter, Sophia	Eltham, Kent.
Sargeant, Samuel	61, Roden Street, Holloway, London, N.
Shannon, John	168, Gallowgate, Glasgow.
Shearer, David Brown	156, New City Road, Glasgow.
Sheriff, Thomas Jackson	149, Chapel Street, Salford, Manchester.
Sibbering, George	Middlesex Hospital, Charles Street, London, W.
Sim, Robert	58, Aughton Street, Everton, Liverpool.
Simnett, Thomas	52, Royal York Crescent, Clifton, Bristol.
Simpson, Alexander	31, Ronald Street, Glasgow.
Simpson, John	80, Patrick Street, Cork.
Simpson, William	Market Place, Bedale, Yorks.
Slater, Samuel	Headingley, Yorks.
Smith, Anthony	11, Upper Well Street, Hill Cross, Coventry.
Smith, Charles Albert	42, Canal Street, Derby.
Smith, Charles Henry	4, Newby Terrace, Bootham Stray, York.
Smith, Percival Henry	80, Argyle Street, Birkenhead, Cheshire.
Smith, William Lyall	Great Hautbois, Coltishall, Norfolk.
Snape, John	Swinton, Lancs.
Soppet, Robert	5, Allerton Terrace, East Cotham, near Redcar, Yorks.
Sotaan, Paul Hellesen	2, Garford Street, Limehouse, London, E.
Spalding, William Richard	Lea Bridge Road, Leyton, Essex.
Spicer, Charles	Ferndale Lodge, Ennersdale Road, Lewisham, Kent.
Spicer, Thomas	Finedon, Northamptonshire.
Spreekley, George	58, Long Row, Nottingham.
Spurgin, Frederick William	Hounslow, Middlesex.
Stanley, Henry	Fore St., Edmonton, Middlesex.
Stead, Samuel	Hanover Place, Leeds.
Stenhouse, Robert	1, Malta Terrace, Edinburgh.
Stevens, Stephen Nobbs	Bridge Street, Downham Market.
Stevenson, Robert Albert William	44, Taylor Street, Liverpool.
Stewart, William Henry	11, Appleford Road, Upper Westbourne Park, London, W.
Stocks, Alfred	Halifax, Yorks.
Stonehouse, Wiiliam	2, Bridge Street, South Stockton.
Story, William	Worksop, Notts.
Sutcliffe, Radcliffe	113, Crown Buildings, Boothtown, Halifax, Yorks.
Swallow, James Edward	Albert Cottage, Kensal New Town, London, W.
Tamplin, George William Dunlop Haddington	University College, Gower Street, London, W.C.
Tanner, Benjamin	2, Hargreave Buildings, Chapel Street, Liverpool.
*Tanner, Herbert	133, Oxford Street, London, W.
*Taplin, Frederick	Bristol.
Taylor, Hannah	17, Saville Street, Manchester.
Taylor, Sydney	Old Charlton, Kent.
Templar, Alfred	3, Denmark Street, Bristol.
Thomas, Richard	Crosswall, Dover.
Thomson, Frederick Charles	Victoria Place, Eastbourne.
Thorp, John	790, Rochdale Road, Harpurhey, Manchester.
Tomlinson, William Frederick	8, Blenheim Square, Leeds.
Toy, George Bentley	153, Summer Lane, Birmingham.
Traverse, Thomas	53, St. Peter's Street, Islington, N.
Turner, Robert John	185, Church Road, Essex Road, London, N.
Twizell, Robert	South Hylton, Durham.
Vincer, Frank	71, East Street, Brighton.
Vine, Richard	112, Westbourne Park Road, London, W.
Ward, Thomas Rowland	3, Ashley Lane, Long Milgate, Manchester.
Warner, Richard	20, Charterhouse Square, London, E.C.
Warren, Frederick	52, Preston Street, Brighton.
Waterfield, David	132, Ladbroke Grove Road, Notting Hill, London, W.
Waterworth, William	77, Cambridge Street, Sheffield.
Watson, Thomas Harrison	30, Osborne Road, Tue Brook, Liverpool.
Watts, John Taylor	69, Hall St., Stockport, Cheshire.
Watts, Walter	15, High Street, Kington, Herefordshire.
Wedge, Theophilus Aston	80, Victoria St., Wolverhampton.
Weller, James William	Nice.
Wells, Joshua Holroyd	6, Church Row, Kirkgate, Leeds.
Wheeler, Frederick Ebenezer	8, Victoria Street, Ryde, Isle of Wight.
Whinfield, William Henry	14, Cantlowes Road, Camden Town, London, N.W.
White, George G.	130, Camden Rd., London, N.W.
*Whitfield, Henry	45, High Street, Worcester.
Whitfield, Henry Spencer	43, Bolling St., Bradford, Yorks.
Whitworth, Frank	7, Holloway Head, Birmingham.
Wightman, James	3, Weston Street, Preston.
Wilding, William	Liscard Park, Liscard, near Birkenhead.
Williams, David	Llanfair Talhaiarn, Denbighshire.
Williams, Evan David	19, Goodge Street, London, W.
Williams, Robert	Tonge, Middleton, Lancs.
Wilson, Alexander Robb	48, High Street, Leven, Fifeshire.
Wilson, Charles Tyler	14, Cambridge Terrace, Islington, London, N.
Wilson, James	212, Evelyn St., Deptford, Kent.
*Wilson, John Henry	Scarborough.
Wood, Alfred Charles	366, Bristol Road, Birmingham.
Wood, Edmund	35, Parkstone Road, Peckham Rye, London, S.E.
Wood, William Turton	7, Blayd's Court, Hunslet Lane, Leeds.
Woodhouse, William	Ambleside, Westmoreland.
Wright, Arthur	Walter Street, Nottingham.
Wright, Edward	21, Durham Street, Middlesborough-on-Tees.
Wright, James	246, Manchester Road, Cubitt Town, London, E.
Wright, Watkin Valentine	21, King Street, Wrexham.
Yewen, Caleb Henry James	1, Clubb's Terrace, Odessa Road, Forest Gate, Essex.
Young, James John	22, Litchfield Road, Old Ford, Bow London, E.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 11, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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INSPECTION OF DRUGS IN THE UNITED STATES.

THE reference made last week, in the course of the discussion on Mr. WILLIAMS's motion, to the existence in the United States of a system of inspection of imported drugs, will perhaps have raised some curiosity as to the nature of the regulations under which it is carried on and whether they would be at all applicable to the conditions obtaining in this country. We therefore avail ourselves of the opportunity afforded by the appearance in a United States contemporary of an article on this particular subject to quote some details as to the legislation under the authority of which the inspection is made, as well as the extent to which the provisions of the law have been carried out.

The United States statute law upon the subject is in substance as follows. It provides that all drugs, medicines, and medicinal preparations (including medicinal essential oils) and chemical preparations, used wholly or in part as medicine, imported from abroad, shall, before passing the custom house, be examined as well in reference to their quality, purity, and fitness for medical purposes, as to their identity as specified in the invoice, and if on such examination any of them are found, in the opinion of the examiner, to be so far adulterated, or in any manner deteriorated, as to render them inferior in strength or purity to the standard established by the United States, Edinburgh, London, French and German Pharmacopœias, and thereby improper, unsafe or dangerous to be used for medical purposes, they are not to be allowed to pass. When a consignment of drugs is condemned the consignee is allowed to re-export it at any period within six months from the date of the condemnation, upon executing a bond to land them outside the United States. If not so re-exported before the expiration of six months the drugs are then destroyed by the custom house officers. At the port of New York, one of the assistant appraisers is appointed with special reference to his qualifications for carrying out such inspection. In the event of an inspector's decision being challenged, an appeal is allowed, and the goods are referred for examination to an analytical chemist of good repute with the medical colleges in the State in which the custom house is situated; but in the event of the referee giving an adverse decision the consignee has to pay all the costs incurred before he is allowed to re-export the goods.

According to an official list furnished by the Deputy-Collector of the New York Custom House, one hundred and seventy-eight bales or packages of drugs were condemned at that port in the course of the twelve months ending June 1 of the present year; no definition is, however, given as to the weight of a "bale" or "package." Of these fourteen were destroyed by fire, one hundred and two were re-exported under bonds, and the remainder were at the close of the year in store, the six months' limit which was to determine their treatment not having yet expired. Among the articles rejected were valerian root (36 bales), sarsaparilla (24 bales), gentian (19 bales), belladonna root and leaves, colchicum corms and seeds, aconite root and leaves, senna, wormwood, comfrey root, horehound, hellebore, Persian opium, rhubarb (30 lbs.), balsam of copaiba and orange peel. No chemicals, medicinal preparations or essential oils were condemned during the same period.

It will be obvious that the introduction of such a law into this country would, as pointed out by Mr. WILLIAMS, probably act injuriously upon the London market. If carried out in its integrity it would prevent the importation of many articles for which manufacturers and others find a legitimate use, although they may not come up to a pharmacopœia standard. For instance, the Persian opium condemned would probably have had its value in the market for alkaloid manufacture, although the sophistication in which the Persians are proving themselves such adepts may have brought its morphia strength down to a low standard. On the other hand, a drug naturally of low quality, which is neither deteriorated nor adulterated, would not appear to be covered by the language of the statute. But it might almost be assumed from the fact that no chemicals or essential oils had been condemned that the statute is only partially carried out, and this view is confirmed by the sensational statements made every now and then as to the quality of specimens of drugs,—imported as well as native,—that are to be met with in the United States markets.

THE INTERFERENCE OF PUBLIC SERVANTS IN TRADING OPERATIONS.

WE notice that among the questions set down on the House of Commons paper are three that bear upon a subject in which many of our readers are much interested, namely, the extent to which public servants should be allowed to take part in the management of trading corporations carrying on business in competition with tax-paying tradesmen. Mr. HUBBARD proposes to ask the First Lord of the Treasury whether officials in the public service are at liberty to engage as promoters, trustees or directors in financial, commercial or industrial adventures, failure in which

might involve them in pecuniary embarrassment or personal discredit, and bring reproach upon the public service; also whether the public servants of the country are adequately remunerated for the services to which the State has an exclusive claim, or whether there exists any excuse or sanction for persons in the service of the State supplementing their official salaries by the proceeds of private engagements; and, lastly, whether in the event of there being no excuse or sanction for the practice he will take effectual means to announce and enforce his disapproval.

At the time of our going to press, these questions have not yet been put, but we shall look with some curiosity for the answer, since it will probably indicate the course the present Government is prepared to take in respect to a grievance from which, more or less, chemists and druggists, in common with all tradesmen are suffering.

THE RECTIFICATION OF THE REGISTER.

On pp. 388—90 will be found a list of persons whose names have become liable to be struck off the Register of Chemists and Druggists through their failure to communicate their whereabouts to the Registrar. It will be remembered that under the provision in the tenth section of the Pharmacy Act, 1868, to enable the Registrar to fulfil the duty imposed upon him of keeping the Register correct, he is empowered to send a registered letter to any registered person, addressed to him according to his address on the Register, to inquire whether he has ceased to carry on business or changed his residence. If no answer be returned to such letter within six months, a second of similar purport is to be sent, and if no answer be given to this within three months it becomes lawful to erase the name of that person from the Register. This is the course, so far as the sending of the letters is concerned, that has been taken with respect to each person whose name is in the list printed this week, and the Registrar now gives formal notice of his intention to proceed to the erasure of these names, unless the persons whom they represent communicate with him on or before the 30th of December next.

It will be observed with regret that the list, which includes about four hundred and twenty names, is an unusually long one, as compared with those that have been published previously at biennial intervals. This difference is hardly likely to be explainable by so large an increase in the number of unreported deaths. The fair inference is that it is mainly due to the failure on the part of a large number of registered persons to take sufficient trouble to inform the Registrar as to their changes of residence. It is a pity, however, that so much labour and expense should be put upon others before such defaulters can be stimulated into the performance of an act which is solely for their own benefit.

EXTRACT OF MEAT, AND THE LAW RELATING TO TRADE NAMES.

In July last, Mr. Justice Field, sitting in Chancery, was occupied for little short of a week in the trial of cases in which Liebig's Extract of Meat Company, Limited, pressed allegations that it was entitled to restrain the use by Mr. R. W. Anderson and others of the title "Baron Liebig's Extract of Meat," and of any portrait of the late Baron Justus Von Liebig. This position was assumed notwithstanding the result of the action against Messrs. Allen and Hanburys, in 1867, in which that firm sustained the public right to call "Liebig's Extract of Meat" by that its proper name, and notwithstanding that the Company had never called the article "Baron Liebig's Extract of Meat," or used any portrait in connection with sales of it. It was felt by us at the time that the case was of especial interest to our readers, but as at the close of the trial judgment was reserved, it did not appear to us desirable to trouble our readers then with the lengthy arguments of counsel or details of the evidence.

On Wednesday, judgment was delivered in favour of the defendants. It contains a *résumé* of the evidence and arguments, and as we intend to present it to our readers *in extenso* next week, we defer for the present any detailed comment upon it. We think that as a judgment carefully prepared after argument by very eminent members of the Bar, and as an embodiment in a concise readable form of the facts of the case and of the law applicable to cases of the kind, it will be found to amply repay attentive perusal.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

At the first meeting of the present Session, to be held on Thursday, November 16, at 8.30 p.m., an address on "The British Pharmacopœia as a Students' Manual" will be delivered by the President, Professor Attfield, F.R.S. The address will be followed by a discussion. At this meeting also the election of officers for the present session will take place.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association will be held at 32a, George Street, Hanover Square, on Wednesday evening next, 9 p.m., November 15, when a paper on "Wild Flowers and their Relation to Insects," will be read by Mr. Cracknell.

THE AUSTRIAN PHARMACEUTICAL ASSOCIATION.

According to a statement made in a report presented at the recent meeting of the Austrian Pharmaceutical Association, in Agram, that Society now consists of 508 ordinary members, 50 corresponding members and 70 honorary members.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, the 1st of November, at the College of Physicians, Kildare Street, Dublin, at three o'clock.

The chair was taken by Mr. Pring and subsequently by the President, Dr. Tichborne.

The other members of the Council present, were Messrs. Allen, Bennett, Brunker, Dr. Collins, Mr. Grindley, Dr. Montgomery, Messrs. McIlwaine, Minchin, Payne and Wells.

The minutes of the annual meeting of the Society and of the last meeting of the Council were read and confirmed.

On the motion of Mr. Allen, seconded by Mr. Grindley, the four examiners of the Society were re-elected.

The next business was the consideration of recommendation No. 3, from the Pharmacy Act Amendment Committee, as follows :—

"That all candidates for the licence shall be required to produce evidence of having passed three years in a *bonâ fide* apprenticeship to an apothecary or pharmaceutical chemist keeping open shop."

Mr. J. C. C. Payne moved, by way of amendment, that the following be substituted for recommendation No. 3:—

"Candidates, before presenting themselves for their final examination, are required to produce indentures of apprenticeship, duly signed by a pharmaceutical chemist or apothecary keeping open shop, stating that the candidate has served a *bonâ fide* engagement of four years in his establishment."

He had carefully thought over the matter and discussed it with members of the Council who were actively engaged in pharmacy, and they agreed with him that a two years' certificate of practical pharmacy was not sufficient, and that the only satisfactory way of preparing young men for functions which were very important for the public was by apprenticeship. Two years was a very short period to give a young man for acquiring all the knowledge of pharmaceutical work that was required from him. He maintained that even four years was a short period for the purpose. It had been said that apprenticeship had to a great extent ceased to exist, but he did not think that those who were practically engaged in pharmacy would agree with that. Young men could only be made practical pharmacists in a medical hall or pharmacy where they got constant practical everyday work. He did not say that it was necessary that they should be employed for the whole four years in compounding prescriptions. The making of tinctures, and the mixing of powders and pill masses were matters to be learned ; and during the first twelve months of his apprenticeship, a young man would have very little chance of being allowed to compound prescriptions. He should learn how to make the preparations first, and there were a number of other matters, apparently trifling in themselves, which it was also necessary for him to learn, so that he would have to spend the first two years in preparing himself for the task of learning how to compound the prescriptions. It had been urged that there were other subjects which he had to learn, such as materia medica and botany; but the fact was that he learnt these daily in his practice of pharmacy. Every time he made a tincture he came across something connected with them. Chemistry also he learned daily in the same way. Analytical chemistry no doubt, he would not get ; but provision had been made for that. Schools for the purpose of teaching it had been recognized by the Council, some of which, if not all, had evening classes. In Belfast they had a chemical school which had been recognized by the Council, and at the evening classes of which young men, who were engaged during the day with pharmacists, learned practical chemistry. From all these reasons he thought a four years' service was necessary, in order to produce pharmacists in whom the physicians and the public would have confidence. He did not propose that his resolution should apply to those who were at present taking out a two years' course ; it should not come into force until after it had received the sanction of the Privy Council.

Mr. Pring: Make it law from the 1st of January, 1884.

Mr. Payne: I consent to make that alteration.

Mr. McIlwaine seconded the amendment.

Mr. Brunker said that while he agreed with almost everything that Mr. Payne had said, he did not approve of requiring from every candidate an indentured apprenticeship. No doubt the four years' service was desirable; but they might extend it to assistants who had been employed during that period with pharmaceutical chemists keeping open shop. He would suggest that the regulation should be:—"Candidates are required to produce a certificate signed by a pharmaceutical chemist or apothecary keeping open shop, stating that they had served a *bonâ fide* engagement either as apprentice or assistant with the person giving the certificate for a term of four years." But if they had a hard and fast rule requiring apprenticeship, they would shut out a great many men who might be ornaments to the Society. Besides some of the best houses did not take apprentices, and such a hard and fast rule would prevent the rising generation from learning their business in those places.

Dr. Collins said he was an old member of the Apothecaries' Hall and had had a good deal of experience in the compounding of medicines for more than fifty years. Several years ago this question was considered at a general meeting of the apothecaries' profession, at which there was a large attendance, and it was then unanimously decided that an apprenticeship or pupilage of three years was long enough to fit a young man entering their branch of the profession for the important function of compounding medicines and for taking charge of an establishment during his employer or master's absence. His own opinion was that unless a young man was extremely dull three years was sufficient for the purpose. Of course that had no reference to the teaching of the other parts of the business. A great many pharmaceutical chemists might think it necessary to have other employments for their apprentices and pupils besides compounding medicines; but in that Society they had simply to consider what time it would take a man to become a good safe compounder of medicine. For his own part he thought three years abundantly sufficient for that. Apprenticeship had now been largely done away with and pupilage was generally taking its place.

Mr. Simpson observed that in country establishments where other business besides compounding had to be done it took the student a longer time than elsewhere to learn compounding. During the first two years the apprentice had to do a great many things besides compounding. Therefore he was not in favour of a shorter period than four years.

Mr. Pring said he had had a great deal of practical experience and would consequently be in favour of a period of five years, but as he could not get it he would accept four. Young men should be at the business for one or two years before they could commence compounding; in many establishments it was three years before they got into the compounding department. They had first to become acquainted with the poisonous and the non-poisonous medicines and to learn to make preparations.

Dr. Montgomery considered that the observations of Dr. Collins applied to apothecaries, who looked forward to practice rather than to the compounding of prescrip-

tions. But those who sought the licence of that Society should have every iota connected with the compounding of prescriptions at their fingers' ends. He was a strong advocate for apprenticeship, otherwise there would be so many doors left open for imposition that they would have endless difficulties in investigating whether a man had put in his time or not. His opinion was that without apprenticeship they would not be able to get a young man to learn his business, or have any test by which they could ascertain whether he was applying himself to it or not. On the other hand apprenticeship gave the employer a legal authority over the young man. He (Dr. Montgomery) would have a period of three years at least. No employer in his senses, or who had any regard for the safety of his clients, would think of putting a young man of perhaps seventeen years of age, and only in his first year, to the work of compounding prescriptions. He served five years himself, and he spent the first in learning mere matters of routine. He thought they might go on from three to a period of five years.

The President said the proposal which was before them involved two matters. One was the length of the apprenticeship or pupilage. In the abstract he had not the slightest objection to a period of five years if it was found to be necessary; but on the other hand they should not throw an impediment in the way of men presenting themselves for the licence. He did not even think that they would be justified all at once in running the period up to four years. He would prefer three years. During the last twelve months only seventeen candidates had passed, and that did not show such a rush to the profession as required a drag to be put on the wheel. Only one passed at the last examination. They knew that a man would be all the better compounder for having served six or eight years; but the Council should have due regard to the practical bearings of any regulations that they made and to how they could be carried out. He was strongly of opinion—and there were a great many members of the Society who agreed with him—that their licentiates came short in general knowledge of the sciences outside compounding. Although they were supposed to have passed an examination in those subjects, their instruction in them was generally of the most superficial kind. There was one of those branches in which instruction was compulsory, and three more in which it was not. He did not agree with Mr. Payne that apprentices learned those things. On the contrary they knew perfectly well that they did not learn either botany or materia medica thoroughly. A great many of them would not know rhubarb or "hippo" in the lump states, because they generally saw them in the powdered form. He was alluding to those who depended for such knowledge solely on what they could acquire during their apprenticeship. However, it was a matter of opinion. Coming to the question of apprenticeship, previous speakers had lost sight of the fact that there was a very large contingent of men who might present themselves for the licence and had had large experience—much larger than those who had served apprenticeships of three or four years could get—although they had never served apprenticeships. Four of the principal establishments in that city would not take apprentices. They said that they preferred to be independent of them, and to engage assistants who were certified having undergone an examination. Of them there were a great number. Perhaps some members of the Council might not be aware of the fact that hardly a week elapsed in which some young man was not examined to see if he were qualified to be an assistant. The anxiety of some gentlemen to create apprentices was hardly consistent with the fact that they refused to allow a recommendation to go forward that the Council should have the power of examining assistants; in fact the course they took really looked as if they wanted to drive young men into becoming apprentices rather than take care that they learned their business. Mr. Payne was one of the gentlemen who objected to the recommendation going forward that there should be an examination for assistants. He thought that was hardly consistent with the position taken by him on the present occasion. He agreed that the Council should, if possible, do away with any certificate that should be a sham. It should be a proof that the four years had been *bonâ fide* spent in compounding; and if that were so the student would have got his knowledge, whether he were an indentured apprentice or not. As to the length of time, he thought it might be three years, and subsequently it could be increased to four.

Mr. Wells said he knew of a house which took a large number of apprentices. They were not bound at first, but indentures were given to them when they were leaving after having served for five years.

Dr. Collins: That was not apprenticeship at all.

The President said he alluded to large establishments in which there were from four to six assistants employed in compounding.

Mr. Payne, in the course of his reply, said he was thoroughly in favour of indentured apprenticeship. He was sure that anyone who had been such an apprentice for four years in a pharmacy where practical work was carried on would recognize rhubarb root or any other root in the Pharmacopœia. It was to be presumed that he would even have to powder the root himself.

The President: I do not think there is one pharmacist in twenty who even makes his own tinctures.

Mr. Pring: We make our own tinctures.

Mr. Allen: So do I.

Mr. Payne: I do not think there is a tincture that we sell that we do not make in our place and I presume it is the same with everyone round the table. All this has been brought about by sham certificates. Mr. Payne said in conclusion that in order to meet the views of the general body of the Council he would alter his amendment to the following:—

> "That all candidates for the licence shall be required to produce a certificate, signed by a pharmaceutical chemist or apothecary keeping open shop, stating that he has served a *bonâ fide* engagement with him, either as apprentice or assistant, in his sole employment, for a term of four years; this resolution to come into force on January 1, 1884."

The President: That entirely meets my views in every respect, only that I wish you would make the period three years at first.

The President having to withdraw his objection to the time,

The amendment was then put and unanimously agreed to, and was subsequently adopted as a bye-law in place of No. 3 recommendation of the Pharmacy Act Amendment Committee.

Mr. Payne then moved the adoption of the following regulation:—

> "To entitle a candidate to pass his final examination he must have a majority of the votes of the examiners, of which that of the examiner in pharmacy must be one."

At the final examination there were three examiners—one in chemistry, one in materia medica and botany, and one in pharmacy. As these regulations at present stood, provided the candidate could satisfy the examiners in materia medica, botany, and chemistry, he could pass his final examination, although he knew little or nothing of practical pharmacy. Now this was not in accordance with the requirements of the Pharmacy Act. It might be urged that it did not occur; but he had been told by an examiner that on one occasion a candidate who was very good in two or three subjects, but could not satisfy the examiner in pharmacy, obtained a certificate. He (Mr. Payne) maintained that in order to obtain a certificate a man should be a good practical pharmacist.

Mr. Wells seconded the motion.

Mr. Allen said he agreed in the main with Mr. Payne's

resolution, but he objected *in toto* to the practice of the matter being decided by the examiners giving votes. It should be decided by a maximum or minimum number of marks. The latter had been the practice for years in the English Society. Mr. Bremridge, the Secretary of that Society, had written to him stating that many years ago they followed the practice of passing the candidates by a majority of votes of the examiners, but that it had been found inconvenient and had been abandoned. He (Mr. Allen) would move the following amendment:—

"To entitle a candidate to pass he must make with the examiner in pharmacy a minimum of 300 out of a maximum of 600; with the examiner in chemistry a minimum of 140 out of a maximum of 300; with the examiner in materia medica and botany a minimum of 140 out of a maximum of 300; and he must not have less than a total minimum of 650 out of a total maximum of 1200."

According to this regulation if the candidate had only a minimum in every subject he would not pass because he would only have a total minimum of 580, consequently he would have to pull up in all or some of the subjects in order to qualify. This was the plan adopted in the Pharmaceutical Society on the other side. He (Mr. Allen) knew that the present examiners were in favour of this mode of proceeding—at least Dr. Duffey and Dr. Davy were.

The President said he agreed in the main with what Mr. Allen proposed. When he was an examiner in the University the practice followed there was somewhat similar. A minimum of 40 per cent. passed the candidate in each subject. He (the President) was opposed to any candidate being allowed to pass who was deficient in any one subject, but he also objected strongly to the result of the examination being placed in the hands of any one examiner. So that he was in favour of Mr. Allen's system; at the same time he would suggest that before deciding on the subject they should get a report from their examiners as to their views on the matter.

Mr. Brunker seconded the amendment of Mr. Allen. His scheme had the merit of giving half the total of marks to the most important subject, namely, pharmacy, and of dividing the remainder of the marks judiciously between the other subjects.

Dr. Montgomery said it would be well to defer their decision on the matter until they should have referred it to their examiners and obtained a report from them.

Mr. Payne withdrew his motion, and moved in place of it that the amendment of Mr. Allen be referred to a committee, consisting of the President, Mr. Brunker, Mr. Allen and Dr. Montgomery, with a request that they would confer with the examiners on the subject.

This proposal was unanimously agreed to.

The Registrar read a letter from Mr. Daniel Joseph McGrath, of No. 2, Dublin Street, Carlow, asking whether hardware merchants, oilmen, etc., were at liberty to keep in stock and vend corrosive sublimate and arsenic, and, if not, what protection was afforded in the matter to pharmaceutical chemists?

The President: He should be referred to the clauses of the Act, and informed that we are not in a position to give a legal opinion on the matter.

Mr. Brunker: The police have power to act if there be any breach of the law.

The President: He should also be informed that if any infringement of the law occurs the police should be informed of the matter.

A letter was read from Mr. John Patrick Henry, of 97, Donegall Street, Belfast, in reference to certain observations lately made by the Coroner of Belfast, on the occasion of an inquest there.

The President said the letter, which had only arrived that day, was too important to be discussed then, and had better be postponed to the next meeting.

Agreed to.

In pursuance of a resolution passed at the Annual Meeting of the Society, the following committee was, on the motion of Mr. Brunker, seconded by Mr. Wells, appointed to confer with four members of the Society, not on the Council, as to the best means of making the Society more attractive to its members:—Dr. Collins, Dr. Montgomery, Mr. Hayes and Mr. Grindley.

Mr. John Evans, of Dawson Street, Dublin, apothecary and pharmaceutical chemist, was elected a member of the Society.

A report of the pharmaceutical examination, held on October 4, stated that one candidate had passed, and one had been rejected.

The Council then adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the above Association was held at the Royal Institution, on Thursday, October 26, 1882.

The Secretary announced that he had received a letter from the President, in which that gentleman explained that he should not be able to attend. He, therefore, in the absence of the Vice-President, who was out of the town, proposed that Mr. Conroy should occupy that position. This motion was seconded by Dr. Symes and carried by acclamation.

The minutes of the last meeting were read and confirmed and the following donations announced:—The *Pharmaceutical Journal*, from the Society, and the *Canadian Pharmaceutical Journal*, from the Editor.

Mr. A. G. Haddock then read the following paper upon—

Fertilizers.

BY ARTHUR G. HADDOCK, A.I.C.

In a former paper (*Pharmaceutical Journal*, April 22, 1882) I dealt generally with the constitution of plants, and of the manner by which they obtained their nutrition and sustenance. I pointed out that they obtain all their mineral constituents and also their nitrogen from the soil in which they grow, and that in land which has been cropped for a length of time, it is necessary to replace those elements which have been abstracted by the removal of the produce.

We saw that the ash of plants varied very considerably in amount and character, and that different vegetables exhausted the soil of different ingredients, or at all events of the same ingredients in different proportions, and hence the wisdom of adopting a system of rotation of crops. But if this system could be carried to its most successful issue it is perfectly clear that it could not go on *ad infinitum*. There must come a time when this robbery would be impracticable, since every useful article had been abstracted and there was nothing left to afford the slightest nutriment to the plants, which we might vainly endeavour to cultivate.

Coming to the question of the repair of the deficiencies by means of fertilizing materials, I may say that there is no such thing as a specific manure, that is to say, one which would be suitable for any kind of crop, and might be applied to any soil under any circumstances. The nature of the requirements must be studied, and the plant must have food, the constituents of which are the same, and as nearly as possible in the same proportion, as its own. Plants meet with a difficulty which does not obtain with animals, since the appetites and natural instincts of the latter lead them in search of the particular kind of food they require, a convenience denied to vegetables, as they are endowed with a very limited power of locomotion. They have, however, considerable gastronomic taste (if I may be allowed to use the expression) and much prefer a substance which is easy of assimilation to one which they have a great deal of

difficulty in digesting. For instance, if you placed in the proximity of a plant which required nitrogen, a little nitrate of soda, a little blood, and some torrefied leather, it would commence its attack on the nitrate of soda, to the neglect of the other two, but if its hunger were not satisfied when this was consumed, it would turn its attention to the blood, leaving the more difficult task of dissolving and absorbing the leather to the less fortunate plant which might succeed it.

It will, then, be seen, in a district which has been heavily cropped, that even if the whole of the nutritive matters have not been removed, those most assimilable must have been abstracted. When this is the case the land must either be allowed to lie fallow for some time, or fertilizers must be added. Except the plant can get at its food in a state of solution during the time of its growth, it is of no earthly use to it. By allowing the land to lie fallow, weathering influence and that of carbonic acid and of water are brought to bear upon the insoluble substances in the soil, so that in time these are rendered soluble and in a condition to be absorbed by the plant. But this would take some time, and the poor British farmer, paying say £4 per acre rent for his land, would likely, before nature had completed this operation, be compelled to "seek fresh woods and pastures new."

The second remedy is the application of fertilizing materials. To be able to say what kind of fertilizer the farmer should use, one ought to analyse the soil to which it is to be applied, and also to know what kind of crop is desired of it. But I am afraid it is expecting too much of the British farmer to think he will pay the necessary fee for obtaining an analysis which he does not appreciate, and which, I sadly fear, he does not believe in.

But although different crops exhaust the land of different substances, we may take it pretty generally that all of these, with the exception of calcium phosphate, alkaline salts, and nitrogen, have been present in such very considerable quantity originally that they will not want renewing, or only at considerable intervals. This statement must be taken in a general sense, and as only involving chemical restitution. Most of the artificial manures in the market are compounded with a view to providing for deficiency in the above-mentioned substances.

Guano is the name given to a large number of artificial and natural fertilizers. Originally this term signified the excreta of sea fowls, and I suppose, properly speaking, does so still, but in ordinary parlance it means pretty nearly anything. The Simon Pure (*i.e.*, Peruvian) guano was found to give such excellent results that it became a very popular article, and was imported in large quantities to this country. The demand for it was so great, and the price so high, that the usual result under such circumstances, adulteration and sophistication, followed, till now the meaning of the word guano has entirely changed, and in fact by itself has practically no signification whatever. We hear, for instance, of Megillones *guano*, which is a *mineral* phosphate of lime, and I have even come across the Alta Vela phosphate designated as guano. The phosphoric acid in the latter phosphate is entirely combined with the oxide of iron and alumina, and is almost worthless.

Then, again, the genuine Peruvian guano is only the ghost of its former self. It retains its distinctive odour, but the amount of nitrogen contained in it has wofully decreased. I do not exactly know what is the reason of this deterioration, but I have noticed that most samples contain a much larger proportion of stones than formerly, which may be attributable to a lower excavation of the deposit. However, it is still a very valuable manure, as it contains both soluble and insoluble phosphate, nitrogen and alkaline salts. The soluble phosphoric acid is combined with soda, potash and ammonia, and the insoluble with lime and magnesia. (The soluble phosphate cannot very well be determined by extracting it with water, as the samples frequently contain oxalate of ammonia, which dissolves some of the insoluble portion. The total P_2O_5 has therefore to be determined, and also the lime and magnesia. These latter are calculated into phosphate, and any P_2O_5 remaining is considered as soluble, and united with the alkalies. But this, by the way.)

The greater portion of Peruvian guano is soluble or readily susceptible to solution in the soil, and is highly stimulative, and must on this account be used sparingly. Another reason why it should be applied in small quantities at a time is that if dealt out with too liberal a hand a portion would get washed away into the drains, or soak into the subsoil, in either of which cases it would be lost. Peruvian guano is very effective on land which is very much exhausted, and should be applied, together with mineral phosphate, rather as a stimulant than a food, and to get the land into good heart, when further applications will be unnecessary. In leaving this, our old friend, I may say that for a soil suffering from ordinary famine, I consider it the premier of fertilizers, and affords us a capital model to imitate.

But as the deposits of natural guano could not yield a sufficient quantity it was necessary to turn attention to other substances which might supply its place, and it is generally considered that, as a rule, artificial fertilizers should contain phosphoric acid, lime, magnesia, alkaline salts and nitrogen. Some chemists, indeed, do not attribute much importance to magnesium salts, as, for instance, M. Ville, in his work on 'Agricultural Chemistry,' recently translated into English by Mr. Crookes, thinks the soil always contains a sufficient quantity, and he has a great opinion of the efficacy of lime, applied as such, or as gypsum. He is also of opinion that the nitrogen of the plant is derived to a large extent from the atmosphere, and that, therefore, the addition of nitrogenous substances to the soil is superfluous.

I was surprised to see this statement, as I thought that question had been quite threshed out, and if the results of the elaborate and careful experiments of Sir J. B. Lawes, Drs. Gilbert and Voelcker, Mr. T Jamieson, and others, in this direction, are not controverted, I think it has been pretty plainly shown that the addition of nitrogen to the soil is a very important factor in the success of the operation.

But all authorities are agreed that phosphoric acid in some form or other must be contained in a fertilizer, and the question then comes as to the mode of combination in which it is to be administered. Almost all natural phosphates yet found are insoluble in water, or very nearly so, and until they can be brought to dissolve in the saline solution and juices found in the soil they are useless, as the plant is unable to absorb them.

Insoluble phosphates of lime, both of mineral and of animal origin, are generally rendered soluble by treating them with sulphuric acid. A quantity of acid is used insufficient to convert the whole of the lime into sulphate, but only two-thirds of it, leaving one-third of it combined with the phosphoric acid, forming a salt freely soluble in water. This compound is called soluble phosphate, or sometimes monophosphate, or again, biphosphate of lime. Why the latter name, which is frequently employed, should be given to it, I am at a loss to see. Insoluble phosphates are thus rendered soluble on a very large scale in this country, and the mixture with the sulphate of lime formed in the reaction is sold under the name of superphosphate. The superphosphate made from bones has been generally regarded as being superior to that made from a mineral phosphate of lime, but unless the mineral contains a large quantity of oxide of iron and alumina, one would think that soluble phosphate was equally valuable, whether it had an organic or a mineral origin. The presence of oxide of iron and alumina in a phosphate is an objection, as the soluble phosphate made from it has a great tendency to revert, or go back into an insoluble form.

There is by no means unanimity of opinion as to whether this reverted or reduced phosphate is as valuable as the soluble variety, but at all events it will not fetch nearly the same price in the market. The processes which have been devised for estimating the amount of the retrograde phosphate are not, to my mind, altogether satisfactory. The method generally adopted is that of first removing the soluble phosphate by lixiviation with cold water, and then treating the insoluble portion with an alkaline solution of ammonium citrate, and reckoning the amount of phosphate dissolved by this reagent as reverted. I have found that a portion of the phosphoric acid of natural tribasic phosphates, such as coprolite, is removed by this process. The ground urged for placing reduced phosphate on the same scale as soluble, is that the latter is converted into an insoluble modification when applied to the soil. This, one would naturally say, is so, since any oxide or carbonate will reprecipitate soluble phosphate; and these are found in every soil.

This theory of reprecipitation before absorption by the plant must, I think, be freely admitted. The idea has of late years been carried further. Admitting the theory, it follows that the insoluble phosphate must meet with certain influences in the soil, which bring it into a state of solution, since it has to be absorbed in this condition by the plant. What causes this solution? In speaking of tribasic phosphate of lime as being insoluble in water, we are not making a statement which is absolutely correct. Certainly, if we placed a lump of mineral phosphate in pure water the amount dissolved, even after digestion for a very considerable period of time, would be quite inappreciable, and the experiment made in this way would appear to justify the usual definition. Again, glass in sheet, if treated with pure water, would remain practically intact, but if we ground the glass to an exceedingly fine powder, we should find that it yielded a weighable quantity to solution. So with phosphates. If they are ground sufficiently fine, it is found that they are to a certain extent soluble. In *pure* water they will dissolve, but the solvent action is much increased if the water contains salts of various kinds and carbonic acid. Such salts are contained in the soil, and so the tribasic phosphate is, to a certain extent, rendered soluble. It would seem, then, that fineness of division is all that is wanted, and all that is gained by making superphosphate. Of course when a soluble phosphate reverts the particles are in an infinitely finer state of division than could possibly be obtained by the most perfect mechanical means. The phosphate would be precipitated in molecules. It would consequently offer an enormously greater surface to the solvent action, and therefore, one would think, should be of greater efficacy.

If fineness of division is all that affects the value of phosphate of lime, one would expect that precipitated phosphate would be as valuable as soluble phosphate. By precipitated phosphate, I mean the article which is sold under that name or under the title of bone extract, and which is made by dissolving tribasic phosphate in acid, and adding lime until all the phosphoric acid is precipitated. In this country it is generally made from bone ash, but I should think that mineral phosphate would do equally well, and that the reason it is not used is on account of the popular prejudice against phosphates of a mineral origin. Sufficient lime is not added in the precipitation to convert it into tribasic phosphate, but generally only enough to form bibasic, and occasionally only a mixture of the latter and monobasic phosphate, so that it frequently happens that if the phosphoric acid found on analysis is calculated into tribasic phosphate (the usual way of stating it) the result shows more than 100 per cent. It is, therefore, necessary to give the amount of lime and of phosphoric acid separately.

As this form of manufactured phosphate is coming more into favour, I thought I would look up the different experiments which have been carried on with it comparatively with soluble phosphate, and I was surprised to find that there is a wonderful consensus of opinion with respect to its value. The reason of my surprise was that there is usually a very perplexing conflict of statements with regard to the relative efficacy of any particular kind of manure. Anyone need only refer to recent literature on agriculture to satisfy himself as to the truth of this statement. However, authorities seem generally agreed in giving high rank to precipitated phosphate, some chemists attaching a higher value to it than to soluble phosphate. Mr. T. Jamieson, of Aberdeen, gives a relative value to soluble phosphate of 12, and to precipitated phosphate of 13, bone ash being 10. This was after six years' careful experimenting. At the International Congress of the Directors of Agricultural Experimental Stations, held in Paris a short time ago, M. Maercker, a director, stated:—"In general, precipitated phosphate of lime employed in the same quantity as soluble phosphate in average soils in good condition has shown itself equal to the soluble phosphate." M. L. Grandeau, the Commissary-General of the Congress, rejoices to hear this expression of opinion from so eminent an authority, as he himself holds the same opinion. He says:—"The experiments of M. Petermann, at the station of Gembloux, and quite recently those also at Halle, published by M. Maercker, clearly confirm the results of my eight years' experience, viz.:—That the crops yielded by equal quantities of phosphoric acid given to plants in the form of superphosphate and in the form of precipitated phosphates are obviously equal." M. Grandeau has experimented on yellow turnips, swedes, oats, grass, potatoes, beet, rape, rye, wheat, barley, maize and oats.

I think that the manufacture of precipitated phosphate will greatly extend, and if so, we shall not be so much troubled with the question of reverted phosphate.

Mr. Thomas Jamieson, F.I.C., to whose researches I have once or twice referred, is the chemist to the Aberdeenshire Agricultural Association, under whose auspices he has conducted a series of experiments with fertilizers, extending over a period of six years, and the results are embodied in the sixth annual report of the Association, a copy of which I am indebted to his courtesy for. These experiments have apparently been very carefully conducted, and that he has not twisted the facts to suit any pet theory he might have formed is proved by his having arrived, at the end of each year, at certain conclusions which he regarded in a tentative manner, and some of which he has much modified. Mr. Jamieson now, however, considers that he has got sufficient weight of evidence to justify him in giving a definite relative value to the different forms of phosphate and nitrogen. As I could not in this paper touch the question of nitrogenous fertilizers, I will content myself with giving his table of the relative value of nitrogen in them, and notice more particularly only the experiments with phosphates.

They have been made by using the system of rotation —the particular one being turnips, oats, grass,—and also, as it was found that the application of phosphates to turnips produced the most marked effect, by cultivating turnips for six consecutive years on the same soil.

I have not space to enter into the minutiæ of the details, which I consider well worth disseminating in agricultural circles, but must confine myself to the general conclusions to which Mr. Jamieson has arrived. These are some of them:—

"1. Non-crystalline phosphate of lime, ground to a floury state, applied to soil deficient in phosphate, greatly increases the turnip crop, and also, though to a less extent, the cereal and grass crops, but always with equal effect, whether it be derived from animal or mineral matter.

"2. Soluble phosphate is not superior in effect to insoluble phosphate, if the latter be in finely disaggregated

form, *e.g.*, disaggregation effected by precipitation from solution, or by grinding bones after being steamed at high pressure. In such finely divided conditions the difference is in favour of the insoluble form, in the proportion of about 12 for the soluble to 13 and 14 for the above insoluble forms respectively. In less finely divided form (such as mineral phosphate impalpable powder) insoluble phosphate is inferior to soluble phosphate in the relation of about 10 to 12.

"3. This conclusion has reference to nitrogenous materials.

"4. Fine division (or perfect disaggregation) of phosphates assists the braird nearly as much, and with more healthy results, than application of nitrogenous manure.

"The most economical manure is probably non-crystalline, floury, insoluble phosphate of lime; the cheapest form being mixed with an equal quantity of the form in which the highest degree of disaggregation is reached."

Experiments which have been carried on in Sussex, Kent, and Huntingdon confirm these conclusions very remarkably, so that it would appear that superphosphate is, as a rule, a very expensive form of fertilizer. Mr. Jamieson brings to light another great objection to it as regards root crops, or more particularly the turnip crop.

Turnips are frequently affected with a disease of a fungoid character known as club-root disease, a most distressing affliction to the farmer, as it is liable to spread very rapidly, and renders useless and kills a large portion of his crop. Now Mr. Jamieson has found as an invariable rule that the growth of this fungus is stimulated by the use of manures containing sulphuric acid, and thinks, therefore, on that account alone, they should be tabooed. This indeed seems a fatal objection to the use of vitriolized manures for turnips.

Phosphates maintain their relative values when applied to rotations in these experiments, though in these cases the effect of them is not so clearly seen as with the turnips, as their effect is obscured by the influence of nitrogenous materials which must be employed. The concordance of the figures leads Mr. Jamieson to the conclusion—"That the superiority of soluble phosphate over precipitated phosphate is practically *nil*. In a final summary of the results of the six years' experimenting he enunciates the follow opinions:—

"Dissolved phosphate is ready but rapid, and tends to unhealthy growth.

"Raw bone powder is steady, but slow and costly. Steamed bone flour is ready, steady, but more costly than insoluble mineral phosphate, which is slow but steady, and least expensive."

He recommends for general use a mixture of two extremes—the largest producer, such as steamed bone flour, or precipitated phosphate, together with the cheapest producer, finely ground mineral phosphates.

As a guide to farmers he gives the following relative values for different kinds of phosphates:—

"Phosphate of iron	0
Phosphate of alumina (Redonda)	3
Tribasic phosphate of lime in bone	10
Tribasic phosphate of lime in mineral	10
Monobasic phosphate of lime in soluble phosphate	12
Bibasic or tribasic phosphate of lime in precipitated form	13
Tribasic phosphate of lime in steamed bone flour	14"

Although I have not been able to go into the question of nitrogenous fertilizers, I think Mr. Jamieson's standards of value for some of them deserve quoting here.

"Nitrate of soda	10
Sulphate of ammonia	10
Guano	10
Nitrogen (only) in bones	8
Dried blood	8"

The latest report of the Aberdeenshire Agricultural Association is pregnant with information, and will well repay careful perusal.

The Chairman having made a few remarks upon the value and interest of the paper,

Mr. A. Smetham discussed the subject, pointing out the difficulties experienced owing to the variations of soil and climate, and concluded by moving a vote of thanks to Mr. Haddock.

This was seconded by Dr. Symes, and after a few remarks by the Secretary and Mr. A. H. Samuel, the proceedings terminated.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, October 31, a lecture was delivered in connection with the above Association by Mr. W. B. Clark, on the "Halogens." The subject was handled in a very able manner, each element being brought before the audience in a very instructive light, much to the credit of the lecturer.

A vote of thanks was accorded to the lecturer at the close, on the proposition of the Chairman, Mr. Edwards, after having been seconded by Mr. Garrett.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

An open meeting of this Association was held in the Pharmaceutical Society's rooms, Edinburgh, on Wednesday evening, November 1, Mr. Peter Boa, President, in the chair.

The minutes of the previous meeting were read and confirmed.

The report of the Apprentices' Prize Examination Committee was then submitted. It showed that the competition had been eminently successful; eight candidates had competed, with the following result:—First prize (three months' practical chemistry, under Dr. Macadam), awarded to Mr. George Coull; second prize (value half a guinea), awarded to Mr. G. A. Grierson; special prize (Griffith's 'Materia Medica,' presented by Mr. William Aitken), awarded to Mr. Thomas Stephenson.

On the motion of Mr. J. D. Robertson, the report was unanimously adopted, and a vote of thanks was awarded to the Committee for their services, and to Mr. Aitken, for his donation of the special prize.

Mr. Boa, in presenting the prizes, congratulated the winners on the excellence of their papers. He regretted that the Committee had not power to award more prizes, as several of the competitors well deserved recognition.

An interval of fifteen minutes was then allowed for the inspection of an exhibition of microscopic objects and rare pharmaceutical specimens. Afterwards two lectures were delivered, on "How to Prepare for the Minor," by Mr. J. R. Hill, and on "Practical Pharmaceutical Chemistry," by Mr. Peter MacEwan.

After the members had expressed opinions on these subjects, votes of thanks were awarded to all who had contributed to the success of the meeting, special mention being made of the interesting contributions of Messrs. Hume, Maben and Purves.

The President having intimated that the next meeting would be on November 22, when a paper on "Alkali Manufacture: Old and New Processes" will be read, the meeting was closed.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the Chemists' Assistants and Apprentices' Association was held in the Café Buildings, Ship Row, on Friday, November 3, the President in the chair, when Mr. Ritchie, Market Street, delivered the

inaugural address, in the course of which he pointed out the advantages derived from and the best modes of conducting such associations.

The address was highly appreciated by all present.

Dr. Moir, Union Place, made some suitable remarks.

A large and successful meeting was brought to a close by hearty votes of thanks to the speakers.

Proceedings of Scientific Societies.

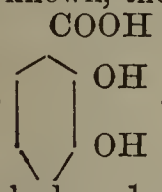
CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 2, F. A. Abel, F.R.S., Vice-President, in the chair.

It was announced that a ballot for the election of Fellows would take place at the next meeting (November 16).

The following certificates were read for the first time:—F. W. Branson, J. S. Bishop, E. E. Berry, R. Blair, R. Coulthard, W. J. Chrystal, T. R. Cowie, R. Carruthers, E. G. Clayton, J. T. Dunn, H. L. Dampier, A. G. Earl, G. Gray, J. L. Howe, A. G. Howard, W. A. L. Hammersley, H. Hotblack, E. Jackson, A. E. Johnson, A. Keen, F. J. Kilner, J. D. McCarthy, H. E. Newton, R. H. Parker, T. E. Peppé, S. E. Phillips, S. Rideal, G. M. Taylor, T. E. Vasey.

Dr. A. K. Miller, then read a paper—

On Dihydroxybenzoic Acids and Iodosalicylic Acids.—Of the six possible dihydroxybenzoic acids five are already known, the sixth acid being represented by the formula 

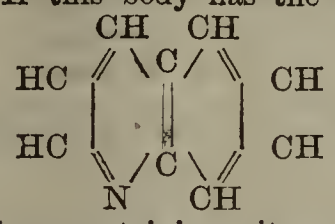
. Two methods were tried for preparing this body:—1. Catechol was heated with concentrated solution of ammonium carbonate in sealed tubes for several hours. The product of the reaction consisted of a mixture of two acids, one of which was protocatechuic acid, the other must be the acid sought for, as this and protocatechuic acid are the only two dihydroxybenzoic acids derivable from catechol. The above reaction gave a very poor yield, and a second method for preparing this catecholorthocarboxylic acid was tried. 2. Salicylic acid and iodine were heated together in alcoholic solution and the resulting iodosalicylic acids purified by crystallization from water. The results obtained differ from those published by Lautermann, Liechti, Demole, etc. It was found that two iodosalicylic acids had been formed, paraiodosalicylic acid melting at 197° and a new isomer melting at 198°. The two differed in crystalline appearance, solubility, etc., but most markedly in yielding two distinct dihydroxybenzoic acids when heated with potash. From the former quinolcarboxylic acid was obtained; from the latter an acid which split up on heating into carbonic anhydride and catechol. The fact of a dihydroxybenzoic acid, derived from salicylic acid, splitting up on heating into carbonic anhydride and catechol is of itself proof that it must have the constitution indicated above. This constitution is however the only one possible for the acid produced together with protocatechuic acid by introducing a carboxyl group into catechol, and since a comparison of the products of both reactions has shown the two to be identical, there can be no doubt that the constitution given is the correct one.

The Secretary then read a paper—

On Crystalline Molecular Compounds of Naphthalene and Benzene with Antimony Trichloride. By Watson Smith and G. W. Davis.—On melting 3 parts by weight of antimony trichloride, and 2 of naphthalene, minute but perfectly symmetrical clinorhombic tables formed in the liquid, after the source of heat had been removed; these crystals were separated with a warmed platinum spatula. They were very deliquescent and had the composition $3SbCl_3$, $2C_{10}H_8$.

A similar compound is formed with benzene, having the composition $3SbCl_3$, $2C_6H_6$.

A second communication was also read by the Secretary entitled—

Additional Evidence, by an Analysis of the Quinoline Molecule, that this Base belongs to the Aromatic Series of Organic Substances.—By Watson Smith and G. W. Davis. The authors have investigated the effect of an exhaustive perclorination, according to the method of V. Merz, on quinoline. If this body has the constitution usually assigned to it 

the portion of the compound nucleus containing nitrogen might be expected to be least stable and to yield, when chlorinated, perchlorethane, perchlormethane and nitrogen, whilst the other portion would yield perchlorbenzene

$$C_9Cl_7N + 7\,Cl = C_6Cl_6 + C_3Cl_8 + N$$
$$C_3Cl_8 + Cl_2 = C_2Cl_6 + CCl_4.$$

Pure quinoline was therefore heated in a strong tube of hard glass with ten times its weight of antimony pentachloride to 170°, then to 280°, to 320°, and finally to 400°, each for a space of five hours. After each heating the hydrochloric acid gas and nitrogen were allowed to escape, an operation attended with some danger; a crystalline black mass was the result, which was washed out with hydrochloric acid, and the antimony separated. The residue was dried and sublimed; by resublimation, etc., perchlorethane melting at 182° and perchlorbenzene melting at 223° were separated. No perchlormethane could be detected, but owing to its volatility it was probably carried off in the violent rushes of gas which took place on opening the tube.

The Secretary then communicated a paper on—

Orcin and some of the other Dioxytoluols. By R. H. C. Nevile and Dr. A. Winther.—Various considerations led the authors to the conclusion that orcin was a dioxytoluol of the constitution 1.3.5, a supposition which has since been shown to be true by Tiemann and Streng. The present research was undertaken to discover, if possible, some practicable method for the artificial production of orcin. The starting point was dinitrotoluol, 1.3.5, prepared from dinitroparatoluidine, the yield being 60 to 65 per cent. The dinitrotoluol was dissolved in an alcoholic solution of ammonium sulphide and water added, when an orange-red substance is precipitated. This was dissolved in dilute hydrochloric acid and reprecipitated by ammonia. The nitrotoluidine was purified, converted into nitrokresol, which was reduced with tin and hydrochloric acid. The chloride was dissolved in a hot mixture of equal parts of sulphuric acid and water, the solution diluted with water and a dilute solution of potassium nitrite added. The liquid was then warmed, filtered and extracted with ether. The red-brown oil so obtained was purified by distillation, and the product by crystallization furnished the dioxytoluol, identical in all respects with orcin. The authors have also prepared orcin from metabromotoluol metasulphonic acid and from metadibromotoluol. The authors have also prepared the dioxytoluol 1.2.4 and 1.2.5, and have investigated the preparation of the body 1.3.4. They have tabulated the reactions of the various dioxytoluols with ammonia, chloride of lime, ferric chloride, etc.

On the Varying Quantities of Malt Albumenoids extracted by Waters of different Types. By E. R. Moritz and A. Hartley.—The authors give tables showing the specific gravity of the worts and the percentage of nitrogen extracted by distilled water and waters containing NaCl, $MgSO_4$, Na_2CO_3, Burton crystals, $Ca(NO_3)_2$, etc. The experiments show that distilled water extracts the smallest amount of albumenoids; salt does not much increase the

extractive power, but calcium salts, especially the nitrate, have a strong extractive power. The authors, however, conclude that the influence of the extracted albumenoids has been very much overrated, as the differences in results are comparatively insignificant; they attribute the characteristics of the finished produce to the direct influence of the mineral matters on fermention, a subject which they are at present investigating.

Mr. Warington suggested that the authors might have carried their investigations further, and estimated the non-albumenoid as well as the albumenoid nitrogen, the extract might have been precipitated by phosphotungstic acid and the nitrogen determined in the filtrate.

On the Derivatives of Ethylene Chlorobromide. By J. W. James.—The author summarizes his principal results as follows:—When preparing ethylene chlorobromide by passing the gas into a solution of chloride of bromine (ClBr), it is necessary, to obtain a pure product and a good percentage, that the chlorine be passed into the bromide at 0° C., otherwise a substance is formed boiling 3° or 4° higher than pure C_2H_4ClBr, which is useless for the advantageous preparation of ethylene chlorothiocyanate. If an aqueous solution of neutral sodium sulphite and ethylene chlorothiocyanate be brought together in direct sunlight the sodium salt of a new acid, ethylene thiocyanosulphonic acid $C_2H_4\begin{matrix}SO_3H\\SCN\end{matrix}$ is produced. By passing ammonia gas into an ethereal solution of chlorethylsulphonic chloride no amide is formed; with ethylsulphonic chloride, however, the corresponding amide is easily obtained. By the action of neutral sodium sulphite in aqueous solution upon ethylene dibromide or chlorobromide isethionate of sodium is produced with evolution of sulphurous anhydride, in addition to the well-known ethylene disulphonate of sodium obtained by Strecker.

After the thanks of the meeting had been given to the authors for their respective papers, the Society adjourned to November 16, when a ballot for the election of Fellows will be held, and the following papers are to be read:—"Contributions to the Chemistry of Tartaric and Citric Acids," by the late B. J. Grosjean; Contributions from the Jodrell Laboratory, Kew: (i.) "Constitution of Lignin and Bastose," by C. F. Cross and E. J. Bevan; (ii.) "Contributions to the Chemistry of Plant Fibre," by C. F. Cross, E. J. Bevan and S. S. Webster; (iii.) "Action of Nitric Acid on Cellulose," by C. F. Cross and E. J. Bevan; "On the Constitution of some Bromine Derivatives of Naphthalene," by R. Meldola.

CHEMISTS' ASSISTANTS' ASSOCIATION.

On Wednesday, a meeting was held at the rooms, 32A, George Street, Hanover Square, W. Mr. Wrenn, President, in the chair. There was a large attendance.

A paper by Mr. F. H. Alcock on "Subnitrate of Bismuth" was read, which will be published in a future number.

A good discussion followed, in which the President, Messrs. Thompson, Winfrey, Braithwaite, Woods, Millhouse and Palmer took part.

A vote of thanks, proposed by Mr. Phillips and seconded by Mr. Woods, was accorded to the author.

Parliamentary and Law Proceedings.

Pharmaceutical Society *v.* Bradford.

The case of the Pharmaceutical Society of Great Britain *versus* Bradford, instituted in the County Court of Yorkshire, holden at Bridlington, in which the plaintiffs sued the defendant for a penalty of £5, incurred by his having used the title of chemist, has been terminated by the defendant paying into court the amount of such penalty and costs.

Pharmaceutical Society *v.* Rickman.

The case of the Pharmaceutical Society of Great Britain *versus* Rickman, instituted in the County Court of Yorkshire, holden at Malton, in which the plaintiffs sued the defendant for a penalty of £5 incurred by him in having kept open shop for the retailing, dispensing or compounding of poison, has been terminated by the defendant paying into court the amount of such penalty and costs.

Pharmaceutical Society *v.* Fletcher.

The case of the Pharmaceutical Society of Great Britain *versus* Fletcher, instituted in the County Court of Lancashire, holden at Southport, in which the plaintiffs sued the defendant for a penalty of £5, incurred by his having used the title of chemist and druggist, has been terminated by the defendant paying into court the amount of such penalty and costs.

Correspondence.

Citrine Ointment.

Sir,—In the course of an interesting paper upon the "History of Citrine Ointment," published by Mr. Cripps in last Saturday's Journal, the author refers incidentally to the "well-known golden eye ointment" which, he intimates, is a preparation of precipitated mercuric oxide. This fact, if it be such, is quite new to me, my impression being that one of the sulphides of arsenic was the active constituent, and that the only doubt which was entertained upon the subject was the question whether orpiment (As_2S_3) or realgar (As_2S_2) was the specific ingredient, no salt of mercury being indicated. I am quite aware that ointments prepared with the yellow and red oxides are used, like the diluted citrine, as substitutes for the original preparation, but, of course, that does not affect the question of its composition.

Possibly Mr. Cripps may have some further information bearing upon the subject to communicate.

Eldon Grove, Rockferry. J. E. Saul.

Inferior Drugs.

Sir,—In corroboration of Mr. Williams's remarks at the last Council meeting and to give further weight to his views, allow me to state that some weeks ago I was offered a parcel of belladonna root a little below the market value. Upon examination it turned out to be the root of *Scopolia Japonica*, a plant closely allied, it is true, to *Atropa Belladonna*, but the substitution of which for belladonna could be no more justified than the use of hyoscyamus or stramonium.

I think it may be assumed this root was purchased at a cheaper rate than belladonna and if distributed might be used in making official preparations; the evil consequence of such a result needs no further comment.

University College Hospital. A. W. Gerrard.

Percentage of Morphia in Ext. Opii Liquid.

Sir,—Will you allow me to thank Mr. Pickard for kindly pointing out an error in my calculations, which is so obvious that I can only account for it by its being one of those slips to which we are liable when over worked?

Shepherd's Bush. John Woodland.

An Old Subscriber.—You do not say what colour you wish to use, but recipes for making suitable coloured liquids of all colours may be found by referring to the indexes.

W. S. Parrott.—We are unable to give you the formula with certainty. The correspondence respecting "Pil. Philip." will be found in vol. iv., pp. 419 and 440.

F. W. Hollingsworth.—(1) No. (2) The Secretaries are Messrs. Stewart and Chrisp; the Assistant Secretary is Mr. W. W. Reeves.

C. W. Price.—We have failed to obtain any information respecting the preparation, but are not quite certain that we have made out the name correctly.

Communications, Letters, etc., have been received from Messrs. Savage, Bedford, Haydon, Shenstone, Lee, A. T., Eurctes, Pulvis.

ORIGINALITY AND RELIABILITY.

HIGHEST AWARDS—MEDALS AND DIPLOMAS
—OVER ALL EUROPEAN AND AMERICAN COMPETITORS.

SEABURY & JOHNSON,

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Of every description, in the most approved form.

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Aconite	per gross,	3	0	0
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Belladonna	"	2	14	0
Capsicum	"	2	0	0
Iron	"	2	8	0
Opium	"	3	12	0
Poor Man's	"	2	8	0
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Witch Hazel	"	3	0	0

Special Formula made to order. A full line of Plain Spread and Porous at same rates.

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Pharmacopœia & Medicinal Plasters, in Rubber Combination.

Porous or Plain Spread, size, 7 in. wide by 1 yard long.

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Aconite and Belladonna	per dozen,	1	16	0
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Blister, Cantharidal	"	1	7	6
Capsicum	"	1	7	6
Mercurial	"	1	16	0
Opium	"	1	16	0
Pitch Burgundy	"	1	7	6
Roborans	"	1	7	6
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Warming	"	1	7	6

A full line, Plain and Porous.

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Belladonna, Lead and Phytolacca Decandra.

SEPARATELY OR IN COMBINATION.

One dozen in a box. 6 & 7 inches in diameter, Porous and Plain Spread.

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PLIABLE AND ANTISEPTIC.

5 yd. rolls, 14 inches wide,.....per 5 yd. roll, 5s. 0d.
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May also be had in Spools, ½, 1, 2 and 3 inches wide.

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Porous or Plain Spread, on Strong Cotton Cloth.
Yard Rolls, 7 inches wide.....per dozen, 17s. 0d.
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AND

On Twilled Linen and Moleskin.

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Also, on Tracing Cloth and Muslin.

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Spread on Cotton Cloth.

Tins, containing 10 leaves	per dozen,	10s.	0d.
Envelopes, containing 6 leaves	"	6	0
Envelopes, containing 3 leaves	"	3	0
Yard Rolls, 6 inches wide	"	10	0
Half-yard Rolls, 6 inches wide	"	6	0

Antiseptics and Absorbents.

A most extensive line, comprising Absorbent, Borated, Carbolated and Salicylated Cottons; Hospital and Flax Lint; Oil Silk and Muslin, Gutta Percha Tissue; Carbolated, Antiseptic, Eucalyptus and Iodoform Gauze; Roller, Flannel and Rubber Bandages, Catgut Ligature, and

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3 & 4 oz., clear blue tinted, plain or graduated	7s. 6d.
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½ oz. and under, white moulded phials	4s. 0d.
1 oz. ,, ,, (Plain or graduated to teaspoons. Long or short series.)	4s. 6d.
1½ oz. ,, ,,	5s. 0d.
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We put **Name and Address on the flat shape bottles, if required, without any extra charge whatever.** Country packages 1s. each. P. O. Orders to be made payable at Chief Office, London. Bankers, London and Westminster Bank. Established upwards of Fifty Years.

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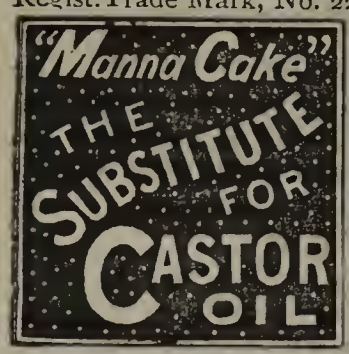

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To counteract cutting houses, and to keep up the Retail Price, the MANNA CAKE is supplied to *one Retail Chemist only* in each district, who has Exclusive Wholesale Profits. *Local Chemists must of necessity order through the Agent.* British Wholesale Drug Houses need not apply. 180,000 have now been ordered. Quantity sent to suit population. All newspaper arrangements are made by the agent at maker's expense. Among recent acceptances are:—Mr. J. Munday, Cardiff, 8 gross.—Mr. K. James, Beverley, 3 gross.—Mr. Gibson, North Shields, 6 gross.—Mr. Brigstocke, Carmarthen, 3 gross.—Mr. Jepson, Sheffield, 12 gross.—Mr. Huband, Tamworth, 2 gross.—Mr. Fyvie, Coleraine, 8 gross.—Mr. Alexander, Galashiels, 4 gross.—Mr. Thomason, Birmingham, 50 gross.—Hamilton & Jones, Bangor, 4 gross.—Mr. Stroud, Bristol, 20 gross.—Mr. Stephens, Huddersfield, 150 gross.—Mr. Kendall, Blyth, 325 gross.—Mr. Davidson, Dundee, 125 gross. N.B.—The output is eight times what it was in June last. For Terms send Stamp to Depôt, 268, Walton Rd., Liverpool.

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These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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According to analysis, is the best. Prepared at the Company's own Works, Santa Elena, South America. Sole Agents, ROCKWOOD & Co., 12, Long Lane, E.C. Agents required.

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Neuralgia, Headache, &c.

MENTHOL CRYSTALS are the only safe remedy for **Neuralgia, Headache, Earache, Toothache, Sciatica, &c., &c.** This drug is applied externally by rubbing the parts affected for a few seconds, when an agreeable burning and then cold sensation occurs, followed by immediate relief.

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SEASON 1881.

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AROMATIC GINGER ALE, SPARKLING MONTSERRAT, CLUB SODA, AND MINERAL WATERS,

As supplied to Her Majesty's Imperial Houses of Parliament,

Have been Awarded SEVENTEEN GOLD AND PRIZE MEDALS at the various International Exhibitions.

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Containing *all* the oil. Special attention is paid to this article, which we crush ourselves from Linseed expressly cleaned and selected for the purpose. In free bags, forwarded *freshly crushed* same day as order received. Price **18/6** cwt. Special quotations for 5 cwts. or more. Second quality, 17/6 cwt. Samples free.

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HORNCASTLE.

Randall's Black Currant Lozenges.

	Net Cash.	To Acct.
Plain Black Currant, old square ...	2/6	2/8
" " " rough oval ...	2/6	2/8
Black Currant and Ipecacuanha ...	2/6	2/8
Black Currant and Tannin	3/0	3/3
Black Currant Voice (warm astringent)	3/0	3/3
Black Currant Cough Lozenges* ...	3/6	3/10

(*Ipecac. and Morph., strength as "B.P.")

In Bottles, 1lb., 2lbs., 4lbs., and 7lbs. For Exportation, in Soldered tins, of any size. From EDWARDS, London; through any Wholesale House; and from the Manufacturers,

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Who will forward Samples by post on application.

Also, BROWN COUGH LOZENGES, 2*s.*, 2*s.* 2*d.*; 7lbs. stamped with name free, and MUSK LOZENGES (*Special*), 2*s.* 6*d.*, 2*s.* 8*d.*

N.B.—Medical Lozenges of every kind, including those of the Pharmacopœia of the Hospital for Diseases of the Throat, London.

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SODA WATER.
SELTZER.
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LEMONADE.
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SODA, POTASH, SELTZER, AËRATED (without Alkali), and LITHIA WATERS. LEMONADE & GINGER ALE.

Each Bottle is protected by a Label bearing the Signature of the Firm.

Purity and Excellence of the Water certified by Analysis by Professor ATTFIELD, Ph.D., F.C.S.

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BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
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TO WHOLESALE DRUGGISTS, CHEMISTS, PERFUMERS, &c.

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Are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean; for exportation likewise.

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64 O. P.

We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

NAPHTHA at current market rate.

CATALONIAN SHERRY

7*s.* 6*d.* per gallon. A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

ORANGE WINE, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. 6*s.* per gallon, net. cash.

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Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article out for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and Füsil Oil. Can be obtained through Druggists with E. B. and Sons' name and label on bottles, &c.

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ESTABLISHED 1782.

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Dated and Sealed April 13, 1854.
Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

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Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

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The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. BAXTER, Secretary.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. MINOR.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, CHEMIST, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

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LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. DAWES, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

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THREE of my Students passed at the October Minor, also TWO at Preliminary.

Laboratory close to Gower Street Station.

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THE

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At the examinations held last month the following students from this School were successful.

6 Major Candidates were recommended to present themselves, the following 4 passed.

Mr. FODEN.	Mr. ROUW.
„ PARKER.	„ STEEL.

9 Minor Candidates were recommended to present themselves, the following 7 passed:—

Mr. COOPER.	Mr. PINCHEN.
„ MADDOX.	„ PROTHERO.
„ OMBLER.	„ SURMAN.

Mr. TOTTLE.

1 Modified Candidate presented himself and passed:—

Mr. COLVIN.

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In connection with the Westminster College has been established for the express purpose of preparing for the various examinations of the Pharmaceutical Society students residing in the country, or those unable to attend a School of Pharmacy.

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THE WESTMINSTER COLLEGE
OF
CHEMISTRY & PHARMACY.

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The question why so many Students pass their Examinations from this College whilst so few succeed from other sources is repeatedly being asked.

The problem is easily solved. The teaching is so thoroughly practical, that students of ordinary ability cannot fail to comprehend and master the various subjects.

Those students who read up for Examination from books, or who attend a School of Pharmacy, where there are not the facilities for learning the subjects practically, not only fail to satisfy the Examiners, but are also found to have acquired a very incomplete and confused idea of the subjects they have studied.

As a proof of the thoroughness of the Education in this College, it is only necessary to refer to the result of the Minor Examinations held in London this month. It will be seen that whilst ONLY 11 succeeded in passing from all other Schools combined, 18 were successful in passing from the Westminster College.

MINOR EXAMINATION, London, October, 1882,

From Westminster College alone, 18.	From all other Sources combined, 11.
Mr. F. T. Brough.	Mr. H. S. Cooper.
,, C. E. O. Betts.	,, M. Dodsworth.
,, W. Bray.	,, T. Fawssett.
,, A. Cardwell.	,, F. W. Maddox.
,, H. C. Dadson.	,, W. F. Norman.
,, F. G. Deacon.	,, W. J. Pinchen.
,, G. S. Dunn.	,, G. R. Prothero.
,, C. P. Dye.	,, J. Robertson.
,, W. A. Easte.	,, E. F. Salmon.
,, J. F. Gummow.	,, T. W. Surman.
,, T. E. Heynes.	,, H. J. Tottle.
,, R. D. Millward.	
,, D. Rees.	
,, T. Hudson.	
,, A. Pell.	
,, R. W. Rees.	
,, F. G. Treharne.	
,, G. A. Yates.	

The following Students were also successful in passing their Examinations from this College.

MAJOR.

Mr. E. Fletcher. | Mr. MacDermott. | Mr. R. F. Roper.

MINOR (Edinburgh).

Mr. A. G. Cobden. | Mr. F. P. Moore. | Mr. R. W. Watson.

PRELIMINARY.

Mr. Bertram. | Mr. Mahood. | Mr. N. Reid. | Mr. Spry.

The Lectures and Classes for the December Examinations have commenced. Students wishing to join them should apply at once.

On Monday, January 1st, 1883, the next complete course of Lectures and Classes will be commenced for the February and April Examinations.

FEES *(from present date.)*

Until the December Examination	**£3 3s.**
Until the February ,, ...	**£7 7s.**
Until Qualified (Minor)	**£10 10s.**
Until Qualified (Minor and Major)	**£15 15s.**

(*Continued on next column*).

Westminster College Advertisement—*continued.*

Students are strongly advised to enter at the commencement of a Course of Lectures.

A completely fitted Dispensary is attached to the College for the benefit of those students who require instruction in this department.

Mr. Wills (Director) provides accommodation for 30 Students at his Private Residence, Gladstone House, St. George's Road, Southwark, S.E. Early application is necessary to secure vacancies in January. Terms £1 1s. per week.

Mr. Fawssett's name appeared in our Advertisement of October 28th. As we have since been informed that he has received instruction elsewhere, we have withdrawn his name from our list.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON.

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IN THE
PHARMACEUTICAL JOURNAL.
GUARANTEED CIRCULATION
7000 Copies Weekly.

Assistants Wanted, Apprenticeships Wanted, Businesses for Disposal, Wanted to Purchase, as also Advertisements of a general character (in column).—Seven lines (50 words) or less, 4*s.* 6*d.* Each line (seven words) extra, 6*d.*

Special terms for **Assistants seeking Engagements** *only.*—Four lines (28 words) or less, 2*s.* 6*d.* Each line (seven words) extra, 6d.

Postage stamps *cannot be received*, but payment may be made either by **Cash** in a Registered Letter, or by **Cheque** crossed London and County Bank, by **Postal Order**, or by **P. O. Order**, payable at Regent Street, W., to J. & A. Churchill.

Estimates for Advertisements, in Wide or Narrow Measure, for Single insertion or for Series, will be sent on application to the Publishers.

The Journal is supplied post free to any part of the United Kingdom, on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad, 22*s.* per annum.

Advertisers are requested to observe :—

1.–That Advertisements are received at the Publishing Office (as below) not later than ten o'clock on Thursday morning, and they must be prepaid.

2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.

3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

J. & A. Churchill, 11, New Burlington St., London, W.

ENGAGEMENTS WANTED.

As Assistant. Age 24. 9 years' experience. Good references. Out-door preferred. A. B. C., 197, Great Portland St., W.

As Assistant. In London. Time for study preferred 4 years' town experience. Beta, 149, Marylebone Rd., N.W.

ENGAGEMENTS WANTED.

DRUG TRAVELLER. — A gentleman with first-class connection in Scotland desires situation as representative of one of the best London houses, either on commission or salary. A. B., Robt. Graham, Newsagent, Eglinton St., Glasgow.

AS ASSISTANT to a Chemist or DISPENSER to a Surgeon. 12 years' experience, London and provinces. Testimonials and reference on application. J. OSTLER, The Cross, Gloucester.

AS ASSISTANT. London preferred. Age 23. Minor and Hall qualifications. Good references. F. H. I., 30, Gascoyne Rd., South Hackney, E.

IMMEDIATELY.—In London. Berth, partial employment. Few months. Assistant of Apothecaries' Hall, London. Highest references. H. H. MASON, Bromsgrove.

AS JUNIOR. Where another is kept preferred. Acquainted with Postal duties. Highest reference. H., Mr. Plant, V.S., Bakewell, Derbyshire.

DRUG Trade.—By a gentleman, re-engagement as MANAGER, LOCUM TENENS, or any place of trust. Thoroughly experienced. Town and country. Good Prescriber. References given. Disengaged. HOLE, Westbury, Wilts.

AS MANAGER or ASSISTANT. In or out-door. Qualified. Over 15 years' varied experience. Good Dispenser and Prescriber. Can Extract Teeth. Now disengaged. Good references. Usual particulars to NEMO, Bank Cottage, Withington, near Hereford.

J. MASON, CHEMISTS' TEMPORARY MANAGER, Cranham St., Oxford. Now disengaged. Two last businesses he managed were, Mr. S. Harris, Droitwich, and Mr. Screaton, Bungay, Suffolk. Terms very reasonable.

JUNIOR. In a good country business. Town and country experience. Age 21. Height 5ft. 10in. Highest references. Disengaged on the 21st. Out-door preferred. JUNIOR, Mrs. Falshaw, Faringdon, Berks.

AS JUNIOR. Seaside preferred. Proposals with time for study considered. 4½ years' good Dispensing experience and references. Age 21. Height 5ft. 9in. FRANK DENDLE, New Rd., Barnstaple.

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AS ASSISTANT in a good Dispensing establishment. London, Manchester, or a large town preferred. 5 years' experience. Aged 20. Good reference. Desires a permanency. Disengaged 1st of December. Height 5ft. 11in. Passed Preliminary exam. Please state usual particulars of hours, salary, and how many assistants kept. ASSISTANT, 22, London Rd., Brighton.

MR. A. K. TAYLOR, TEMPORARY MANAGER, 31, Cottenham Rd., Holloway, N. (from Clapton Park). Terms, 6*s.* a day, 35*s.* a week, and travelling expenses. References forwarded. Disengaged.

AS JUNIOR in a good business, with easy hours or time for study. WYNNE PIERCE, 105, Regent's Park Rd., N.W.

AS JUNIOR. Age 22. Major qualification. Country preferred. Moderate salary, being desirous of extending experience of Dispensing Retail. Good references, &c. MYRRH, 18, Canonbury Villas, Islington, N.

AS Junior ASSISTANT. Age 20. Height 5ft. 4in. Over 5 years' experience. Good references, &c. Now disengaged. Yorkshire preferred. CHEMICUS, 28, Park Cres., Monkgate, York.

ENGAGEMENTS WANTED.

OUT-DOOR. Junior ASSISTANT in Retail. Aged 23. Nearly 2 years with West-end chemist. Or in Wholesale. 4 years in mercantile house. G. J. E., 64, Belsize Rd., N.W.

AS out-door ASSISTANT to Chemist or Doctor, with time for study. Age 27. Disengaged. State particulars. S., 20, The Grove, Clapham Rd., London, S.W.

AS JUNIOR. Seaside preferred. Age 20. Height 5ft. 8in. 6 years' experience in town and country. Time for study. Highest references. LOUIS BECKETT, 82, King's Rd., S.W.

ASSISTANT (out-door) requires a permanent situation or to MANAGE a Branch. Married. Aged 37. E. H., Messrs. Compton & Son, Pharmaceutical Chemists, Margate.

AS ASSISTANT. In London. Age 24½. Major qualification. West-end experience. FREBOR, 149, Marylebone Rd., N.W.

AS ASSISTANT. Competent, but unqualified. 9 years' experience in first-class Dispensing, Prescribing and Retail. Age 24. Excellent references. Disengaged. M., 84, Praed St., Paddington, W.

ASSISTANT to a Chemist or DISPENSER to a Surgeon. 10 years' experience. Age 26. Height 5ft. 10in. Good references. Out-door. Speak French. JOHNS, 27, Endsleigh Gardens, N.W.

BY a competent ASSISTANT of good address. France not objected to. Excellent references. Age 22. Height 5ft. 6½in. ALPHA, 5, North Cres., Bedford Sq., W.C.

AS JUNIOR. In London or suburbs preferred. Age 21. Height 5ft. 10in. 5 years' experience. W. W., Medical Hall, Queen St., Ramsgate.

AS Temporary MANAGER or ASSISTANT, by the day or otherwise. Thorough experience. Stock got up. Terms moderate. Age 30. T. P., 3, Norfolk Ter., Shakspeare Rd., Brixton, S.E.

AS JUNIOR. 4 years' experience. Age 21. Height 5ft. 8in. BONUM, Mr. Mill, Chemist, Holsworthy.

AS JUNIOR in a good class business. Age 20. 4 years' experience. Good reference. London or large town preferred. A. J. L., Mr. Price, Chemist, 1, Nevill St., Abergavenny.

AS ASSISTANT. Age 29. Married. Country not objected to. Good references. Please state salary, &c. ALPHA, 3, Clare St., Sutton St., New Wortley, Leeds.

AS ASSISTANT. In town or country. Age 26. 8 years' experience. Good reference. Abstainer. State particulars. OZONE, care of Mr. Jones, Pantykendy Arms, Abernant, Carmarthenshire.

AS ASSISTANT or MANAGER. Thorough experience in Dispensing, general Retail and Prescribing. Reference highest order. Locum Tenens till permanently engaged. CHEMIST, 111, Railton Rd., Herne Hill.

AS ASSISTANT. Now disengaged. 5 years' experience in first-class Dispensing business near London. Age 22. Height 6ft. R. B., Asher House, Dartford, Kent.

AS ASSISTANT to Dispensing and Retail. 7½ years' experience. Age 22. Height 5ft. 10in. F. S. R., 51, Ethelbert Rd., Margate.

AS Temporary ASSISTANT or LOCUM TENENS. In town or country. London and country experience. Minor qualification. Age 26. T. ASCOTT, Broad Clyst, Exeter, Devon.

AS out-door ASSISTANT or MANAGER. Major qualification. Age 38. Good reference. London preferred. CHEMICUS, 168, High St., Camden Town.

ASSISTANTS WANTED.

TRAVELLERS (town and country) required, on commission, having a connection amongst Exporters and Perfumers, Wholesale Fancy Houses, Stores, Stationers, and Druggists, to represent a well known Speciality. State firm now representing. Address fully, A. B., 4, Manchester St., Brighton, Sussex.

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PARIS.—In a first-class establishment, a Dispensing ASSISTANT is required, speaking French. No one need apply whose character and antecedents will not bear the strictest scrutiny. A liberal salary is offered in return for experience. Good address and serious business habits. Enclose carte (to be returned) with references, to CHEMICUS, Library, 224, Rue Rivoli, Paris.

FRANCE.—For December 1.—A qualified ASSISTANT, of gentlemanly appearance and address, accustomed to the routine of a first-class business. One with knowledge of French language and pharmacy preferred. Address (enclosing card), giving age, height, salary required, and references, PHARMACIE LINDEWALD, Menton (Alpes Maritimes), France.

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ASSISTANT. About 22. Of good address. Accustomed to a Dispensing business. Apply, stating age, height, salary (in-doors) and enclose carte, to S. HUGGETT, Fairfield Pharmacy, Liverpool.

IN an Open Surgery.—AN ASSISTANT, to attend to the Retail, Dispense, and keep the books. Preference would be given to one able to attend an ordinary case of Midwifery. Salary £30 (in-door). Address, SURGEON, 53, Packington St., Islington, N.

ASSISTANT for a Dispensing and light Retail business, where only one is kept. Personal application and unexceptional references necessary. One seeking a permanency preferred. Qualification not essential. Apply to J. J. CHAPMAN, Pharmaceutical Chemist, 20, Boundary Rd., St. John's Wood, N.W.

EARLY in December.—In-door ASSISTANT. About 25 years of age. Minor qualification. Able to Prescribe and Extract Teeth. Apply, stating age, experience, height, salary, references (which must be good). Total abstainer preferred. A. B. C., care of Messrs. Barron, Harvey & Co., Giltspur St., London, E.C.

IMMEDIATELY.—AN APPRENTICE. Out-door preferred. Apply, 60, Queen St., Ramsgate.

MANAGER. A gentleman of business habits. 25 to 30. Competent in every respect to take charge of a good business. Able to Prescribe, Extract Teeth, &c. In-door preferred. Salary £50 per annum to commence. References must bear strict investigation. Address, stating age, height, experience and references, M. P. S., 54, Great Mersey St., Liverpool.

A QUALIFIED ASSISTANT. Accustomed to Dispensing and good-class country business. Age about 22 years. H. W. ALLEN & Co., Chemists, King's Lynn.

ASSISTANTS WANTED.

TO Parents and Guardians.—WILLIAM H. BUCHER, Pharmaceutical Chemist, Truro, has a vacancy for a well educated, gentlemanly youth as an APPRENTICE. Comfortable home, and every facility for acquiring a thorough knowledge of pharmacy. Premium required.

A JUNIOR. Accustomed to good-class Dispensing business. Suitable opening for a gentleman who has just completed his apprenticeship, wishing to extend his knowledge of London suburban business. Comfortable home. Good testimonial required. Address, CHAS. SAUNDERS, Chemist, Highgate, London, N.

A SINGLE gentleman, age about 30, and qualified, to take the entire MANAGEMENT of a widow's business in London suburb, E. Salary and commission on returns over a specified amount. A comfortable situation for a man of quiet steady habits. Apply to CHAS. SAUNDERS, Chemist, Highgate, London, N.

IMMEDIATELY.—IMPROVER or TURNOVER. Of not less than 2 years' experience. Must be steady, trustworthy and obliging, and willing to make himself useful. State terms, age, height, and references, enclosing photo. if possible (to be returned), to J. HOLLOWAY, Chemist, Post Office, Finsbury Rd., Wood Green, N.

AN ASSISTANT. In-doors. Comfortable home. Age from 24 to 30. To take principal charge of a branch Light Retail and Dispensing business. Must be good Salesman and Dispenser, and of gentlemanly appearance and address. Also a JUNIOR, about 21. Address, stating when at liberty, age, height, salary required, with references and carte (to be returned), E. MARRIOTT & Co., Dispensing and Family Chemists and Homœopathic Pharmaceutists, Robertson St., and Havelock Rd., Hastings.

BY February next.—A steady ASSISTANT, Minor qualification preferred, to Manage a Retail Chemist's business in the suburb of a large city in the Western States of America for two months, during absence of proprietor. Apply by letter to ROBT. WILLSON, Sparkbrook Post Office, Birmingham.

A RELIABLE ASSISTANT, accustomed to country trade, with Dispensing and Prescribing. Must be a good Counterman, energetic and obliging, with good address. State full particulars, with photo. if convenient, to RANDAL HOW, Chemist and Dentist, 26, St. Clement's, and 192, Cowley Rd., Oxford. Also a vacancy for an APPRENTICE.

A JUNIOR ASSISTANT, accustomed to a first class Dispensing business, who can speak French. S. J. WESTON, 151, Westbourne Ter., Hyde Park, W.

ASSISTANT. Age about 21. Thoroughly trustworthy. Out-door. Small Retail. To take charge in absence of principal. Immediately or before December. Total abstainer preferred, and character must bear strict investigation. Ample time for study to one reading up for Minor. Enclose carte (to be returned), stating age, height, salary required, and references, to CHEMICUS, 11, Cranbourne St., Hull.

AN able ASSISTANT, for one of our firms in the East. Apply by letter to A. S. WATSON & Co., 106, Fenchurch St., E.C.

APPRENTICE. A well educated youth in a good class country business. One who has passed the Preliminary or its equivalent preferred. Apply, W. W. CALLANDER, Chemist, Ilminster, Somerset.

IN a West-end business. A Junior ASSISTANT, from 21 to 24. He must be a good Dispenser and accustomed to first-class Retail. Apply personally to Mr. GREENISH, 20, New St., Dorset Sq.

A COMPETENT DISPENSER, with Minor qualification. One with London experience preferred. Apply to A. P. S., 45, Craven Road, Westbourne Ter., W.

ASSISTANTS WANTED.

A DISPENSER, from 9 to 10 a.m., and from 2 to 3, 5 to 6, and 7 to 8 p.m., at 14, Portland Pl., Lower Clapton, E. Salary £1 a week to start with. In a few months the whole of the Dispenser's time will be required, and the salary will be increased. Apply by letter only, stating recommendations, &c., to M. D., at above address.

TO Christian Parents.—A vacancy at Brighton for a well educated youth as APPRENTICE, about 17, who has passed the Preliminary examination. A comfortable home, with Christian influence, and time for study. Present pupil has taken 4 first prizes and silver medal in Chemistry at School of Science and Art. Address, PHARMACIST, 425, Strand, London.

APPRENTICE.—E. C. LEWIN, Pharmaceutical Chemist, Market Pl., Boston (Established 1822), has a vacancy for a gentlemanly, well educated youth, who has passed the Preliminary examination. Particulars on application.

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AT once.—A competent ASSISTANT. Salary 30*s.* per week (out-door). Photo. required (to be returned). L. F. FRESSON, Pharmaceutical Chemist and Wholesale Druggist, Hanley.

WAREHOUSEMAN. — A strong, active man, to take charge of a warehouse in the druggists' sundry and patent medicine trade. Aged about 25. Must have a knowledge of the trade. Also ASSISTANT to the above. Aged about 21. State age, experience, and salary required. Address, M. R. & Co., 9, Clerkenwell Rd., London, E.C.

SEASIDE.—An ASSISTANT, about 22 years of age, for a light Retail and Dispensing business. One who is desirous of a permanency preferred. Address, stating age, height, references, salary required, and enclose carte (to be returned), E. M. SMITH, The Medical Hall, 34, St. Thomas St., Weymouth.

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MESSRS. GURDEN BERDOE have for transfer:—SOUTH COAST. Old established Retail. Same hands 27 years. Returning £1050. Rent £25. £1000, or offer. Suit young man commencing. SOMERSET (Coast). Dispensing and light Retail. Returning £750. Handsomely fitted. Good house. Offer. SURREY. Pleasantly situated. Returning £700. Full prices. Good house. Same hands 10 years. Rare opportunity for practical Dentist. £550. SUSSEX. Dispensing and Family Trade. Returning £1460. Good house. £1300. BERKS. Delightfully situated. Elegantly fitted. Returning £550. Only £400. ESSEX. Unopposed genuine Family Retail. Returning £700. Rent £30. Good house, garden, and stable. LONDON, N. Handsomely fitted Retail. Returning £600. For £400. W. Elegantly fitted. Important thoroughfare. Returning £700. Select suburb. 5 miles out. Pure Dispensing trade. Showing £350 net profit. For £650. Please apply, 30, Jewry St., Aldgate.

IMMEDIATELY.—In fashionable suburb, West of England. Rising neighbourhood. A small high class BUSINESS. A good opening for a gentleman of small capital. Best prices. Shop well fitted. Large plate-glass window. Good house, with garden, pleasantly situated. Easy terms. No agents. BERTER, Buckingham Vale, Clifton.

IMMEDIATE offer. Genuine and profitable RETAIL, with Post Office. In London, S.E. Returns over £450. Old established and well stocked. Good opportunity for a beginner. H. TAYLOR, 6, Bird St., Brook St., Kennington Rd., S.E.

BUSINESSES FOR DISPOSAL.

MALLOW, Co. Cork. — Important to Apothecaries and Pharmaceutical Chemists. — To be sold, the interest in the well established BUSINESS of Fitzgerald's Medical Hall, situate in the main street, Mallow, and having an extensive connection in the town and neighbourhood. The shop, which has been recently remodelled, is fitted in the most tasteful, expensive and modern style, and is fully stocked and supplied with all necessary appliances, business having been carried on up to the present. The owner is disposing of the above solely in consequence of his inability to give it his personal attention. Proposals will be received by WILLIAM J. FITZGERALD, Solicitor, Mallow, to whom all enquiries, &c., can be addressed.

BIRMINGHAM.—Cash Retail, Dispensing, Prescribing and Dental BUSINESS. Aerated water trade attached. Returns £500. Rent £25. A man of moderate energy and perseverance could treble the business in two years. Stock and fixtures amount to over £200. Price £375. Proprietor leaving England. Apply A. B., Mr. Mountford, 15½, Bull Ring, Birmingham.

OLD established, 1828.—Family Chemist's BUSINESS for immediate disposal, on account of failing health. In present hands 25 years. First-class position, within 5 minutes of Victoria Station. Rent £130. Cash required to enter £150. Address X., Rastall's Library, Ebury St., S.W.

LIVERPOOL.—Family, Dispensing, and Prescribing BUSINESS, in a leading thoroughfare. Full prices. In consequence of ill-health of proprietor, must be disposed of immediately. No reasonable offer refused. Average returns for last two years £700 per annum. Apply, X. Y. Z., care of Evans, Sons & Co., 56, Hanover St., Liverpool.

AN old established BUSINESS, to which for the last six years has been added the manufacture of mineral waters. It is situate upon the banks of the Thames, in a rapidly improving summer resort, and can be extended in both branches considerably. Full prices. Long lease, at low rental, with very commodious premises. Apply, in first instance, to THAMES, 61, Tollington Rd., Holloway, London.

AT Christmas, or earlier if necessary.—A Chemist's BUSINESS. In one of the prettiest and most healthy towns in Yorkshire. Takings £400 a year; all full prices. Established 24 years. Also, Mineral Water Factory attached. Established with Patent Bottles and Syphons last year. Already doing good trade, and of course can easily be increased. Also, Branch Business in large village. Very pretty. 4 miles away. Established 1½ years, and now doing £200, and increasing. Low rent. Easily managed. Well stocked. Price together £800, or will be disposed of separately. Address, A. K., Messrs. Sanger, 489, Oxford St., London. No agents.

IN the midst of the Staffordshire Potteries. With capital frontage. Best corner position, and good large house at low rent. An old established BUSINESS (26 years). Owing to death of late proprietor. Returning £650 per annum. Mainly consisting of Prescribing, Tooth Extraction, Drugs, &c. All ready money, and capable of very great extension. Price (including a Proprietary Pill which has been well advertised), £550. Address, Mrs. P. MILLER, 1, Waterloo Rd., Burslem, Staffordshire.

MR. HINE GILBERT has for disposal:—Very old established Business. In main WESTERN thoroughfare. Only £450. Also, THAMES VALLEY. Thoroughly reliable. Select. Little opposition. Full prices. Good house. £525. Also, rising LONDON SUBURB. Close to station. Returns £600. Increasing. Good residence. No opposition allowed. On most easy terms. Apply, personally, at 17, Hart St., Bloomsbury Sq.

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A DISPENSING and light Retail BUSINESS (a Branch), situated in the midst of a beautiful and extensive agricultural district. A nice trade done also in seeds, sheep dipping, and general farmers' requirements. No opposition, and full prices for everything. To anyone accustomed to a country trade this would be found to be a good speculation. Takings £8 per week, which could be increased if superintended by the proprietor. Rent and rates very low. Price £400. A. B., care of H. C. Mason, 1 and 2, Australian Avenue, E.C.

CAPITAL little Retail and Prescribing BUSINESS, at the East-end. Returns over £5 per week. Much neglected. Can be doubled. Main road of great traffic. No immediate opposition. Real opportunity for small capitalist. Under exceptional circumstances low sum of £155 cash taken. Apply, Mr. WRIGHT, 128, Ball's Pond Rd., N.

NORTH Wales, Coast.—Genuine Family Retail and Dispensing BUSINESS. Shop well fitted and stocked. Very satisfactory reasons for sale. Returns £500. Lease can be had. An exceptional chance for a beginner. Price, valuation. For further particulars apply R. Messrs. Hearon, Squire & Francis, 5, Coleman St., E.C,

WANTED TO PURCHASE.

A GOOD Family Retail, Dispensing and Prescribing BUSINESS. In a market town in Midlands or South England preferred. Not too far from London. Returning about £600 per annum. With Agricultural trade not objected to. Full particulars to FALSTAFF, West Holme, Goring Heath, Reading.

LIGHT RETAIL, to return £700, where Dentistry might be added. Preference given to one where part could remain, and proof allowed. Address, SIGMA, Heath & Co., Crayford, Kent. No agents. South preferred.

FOR SALE, BARGAINS.

THE entire Fittings of a Chemist's Shop, comprising mahogany fronted Drawers, with shelving over, Window Enclosure, Counters, Wall Cases, Dispensing Screen, Counter Case, upright Case and Desk, Bottles, Jars, Carboys, suitable for a shop about 18ft. deep. £35. Can be seen fitted in place. E. NATALI, 207, Old Street.

20 FT. mahogany top Counter, £9; 20ft. mahogany front and top Counter, fitted with 20 drawers, £15; a 18ft. mahogany top ditto, £7; 8ft. ditto, ditto, fitted with 15 drawers the entire length, £6; 12ft. 6in. ditto, ditto, 24 drawers, £10; 5ft., 6ft., 7ft., 8ft. and 10ft. mahogany top Counters; a number mahogany top Cupboards; 16ft. Dispensing Counter, suitable for a dispensary, to fit against wall, fitted with sink, drawers and cupboards under, and shelving on top; a number of mahogany Nests of Drawers, 4ft., 6ft., 8ft., 10ft., 12ft., 16ft. long, with or without shelving over, glass knobs and bevelled edged labels. E. NATALI, 207, Old Street.

SPONGE Cases, fig. A 43, £5; fig. A 41, 65s.; Desk and Cases, fig. A 31, 65s.; fig. A 32, 45s.; a 10ft. 3in. bent Plate-glass Counter Case, brass frame, £9; a 9ft. 9in. ditto, ditto, mahogany frame, £8; 6ft. 6in. ditto, ditto, £7; 6ft. ditto, ditto, A 18, £7; 5ft. ditto, ditto, £6; 4ft. ditto, A 17, 90s.; 4ft. ditto, A 16, 80s.; 3ft. 6in., A 16, 70s.; 3ft. ditto, 60s.; 2ft. 6in. ditto, 50s.; 6ft. ditto, ditto, A 7, £7; 3ft., fig. A 8, 40s.; a large number of other Glass Counter Cases too numerous to mention in list; Plate-glass Dispensing Screens, 5ft. long, 6ft. long, 7ft. long, glass case at each end, with silvered glass centre, with marble slab in front, tablets on top, silvered glass backs inside cases, and fitted with movable shelves, very elaborate, £8 10s. each; a 8ft. Dispensing Screen, A 68; a ditto, ditto, 5ft. 9in.; Dispensing Screens, A 55, 5ft. long, £6; 6ft. long, £7; 4ft. 6in. long, with silvered plate-glass back inside, £7. E. NATALI, 207, Old Street, London, E.C.

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3. ESSEX (near Town).—Light Retail and PRESCRIBING. Returns over £1000. Net profits over £500. Rent £20. Price about £900. Serious illness cause of sale.
4. LONDON, W.—Very profitable Retail, Prescribing and DISPENSING. Returns over £6 weekly, and capable of great extension. Rent £55. 8-roomed house. Price £350.
5. BERKS.—Good Dispensing, Prescribing and RETAIL. Returns £250. Price £250.
6. YORKS.—Seaside town. Dispensing and light RETAIL. Returns about £800. Gross profits half. Good house. Price £550.

Gentlemen seeking investments are respectfully requested to apply to T. & T. for their PRINTED REGISTER, which contains particulars of about 200 other businesses, ranging in price from £80 to £2500.

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C.—Returns £500. LONDON SUBURB. Price £400.

D. ,, £400. DEVON. Price £350.

E. ,, £900. Mixed country TRADE. Valuation stock and fixtures.

F.—Net profit £250 per annum. Price £300.

G.—Returns £900 from Soda Water and Drug TRADE. Valuation of stock, fixtures and plant.

Business marked A is specially worthy of notice.

Full particulars of either sent on application, per post or otherwise.

No charge to purchasers.

Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xviii.

Midland Counties' Transfer Agency.

F. J. BRETT,

Trade Valuer and Auctioneer,

LEICESTER.

VALUATIONS.—In consequence of the increased demand for Mr. BRETT'S services as a Valuer, it is essential, to prevent disappointment, that engagements should be made early.

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F. J. BRETT has always on his Register between 200 and 300 Businesses in all parts.

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F. J. BRETT'S practical knowledge of the trade in all its branches renders him specially adapted to act as trustee in Liquidations and Bankruptcies. Chemists in difficulties can have their affairs settled by private arrangement.

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LONDON, S.E.—Old established RETAIL. Under bad management returns £10 week. In capable hands can be doubled. Valuable lease. Price £600.

DURHAM CO.—Old established Dispensing, Prescribing and light RETAIL, with family connection in Wines and Spirits. Drug returns £1300, Wines and Spirits £800. To an energetic man this presents unusual facilities for extension. Goodwill £100. Stock and fixtures at valuation—about £800.

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TONGA—IMPORTANT NOTICE

REDUCTION IN PRICE.

ALLEN & HANBURYS are glad to state that they have been able to make arrangements for an important reduction in the price of TONGA. The size formerly sold at **4/6** is now reduced to **2/9**, and larger sizes are put up at **4/6** and **11/-**. Wholesale, **28/-**, **46/-**, and **114/-** per doz. Usual discounts.

The great reputation gained by Tonga during the two years that it has been before the public sufficiently testifies to its intrinsic value, a value which is recognised by the medical profession, as evidenced by the habitual way in which it is prescribed by leading physicians both at home and abroad. The *Lancet*, after devoting three long papers to remarkable cases of Neuralgia cured by Tonga (see papers by Dr. Murrell, Dr. Ringer, Dr. Lush, and C. Bader, Esq., on March 6th and 20th, and May 29th, 1880), recently wrote: "Tonga maintains its reputation in the treatment of Neuralgia;" whilst the *Medical Press and Circular* speaks of Tonga as "Invaluable in Facial Neuralgia;" and adds, "It has proved effective in all those cases in which we have prescribed it." Tonga may be obtained from all Patent Medicine houses, and from the Sole Consignees and Manufacturers.

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Prepared by Patent Process.

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BLACK CURRANT		,,	,,	,,
DELECTABLE		,,	,,	,,
EXTRACT OF MALT		,,	,,	,,
GLYCERINE.....		,,	,,	,,
LICHEN		,,	,,	,,
LIQUORICE		,,	,,	,,
MAGNUM BONUM		,,	,,	,,
PECTORALE		,,	,,	,,
PINE (Pâte de jujube)		,,	,,	,,
RASPBERRY		,,	,,	,,
ROSE		,,	,,	,,
TAMARIND		,,	,,	,,
VIOLET		,,	,,	,,
VOICE		,,	,,	,,

		1-lb. size.	1/- size.	6d. size.
	PASTILLES 2/2 per lb. or in tin boxes.	Per doz. 32/-	Per doz. 8/6	Per doz. 4/4
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All the above tins are neatly wrapped ready for sale. The One Pound Tins are returnable at 6/- per dozen.

GUIMAUVE, cut into Cubes	2/6 per lb.	36/-	8/-	*not supplied.*
GUIMAUVE PASTILLES..	2/6 per lb.			
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Sold only in round boxes to retail at 1/-, 1/9, and 3/- each; 9/-, 16/-, and 27/- per doz.

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1.—**Morphia.** ($\frac{1}{40}$ of a grain.)
2.—**Ipecacuanha.** Are readily taken by children. These pastilles are of the same strength as the B.P. lozenges.
3.—**Morphia and Ipecacuanha.** ($\frac{1}{40}$ grain Morph., and $\frac{1}{4}$ grain Ipecac.)
4.—**Compound Morphia and Ipecacuanha.** A more active remedy than No. 3. ($\frac{1}{40}$ grain Morph., $\frac{1}{6}$ Ipecac., $\frac{1}{6}$ Squill, &c.)
5.—**Opium and Belladonna.** An agreeable substitute for the Torch: Opii B. P., and of the same strength.
6.—**Aconite.** Each Pastille equivalent to half a drop of the B. P. Tincture.
7.—**Compound Camphor or Voice.**
8.—**Chlorate of Soda.** May be taken whenever the throat is uneasy.
9.—**Lithia.** An agreeable mode of taking this alkali. Each pastille contains 1 grain.
10.—**Benzoated Voice.** Useful to public speakers, &c. Less active than the Compound Camphor, No. 7.
11.—**Chlorate of Potash.** A more agreeable form than the lozenge of the Pharmacopœia.
12.—**Chalybeate.** (Pastilli Ferri., A. & H., 1 grain Citrate of Iron.) An agreeable form of lozenge, readily taken by children.
13.—**Krameria.** Containing 2 grains of Extract in each.
14.—**Tannic Acid.** Containing $\frac{1}{2}$ grain in each.

These Pastilles are supplied in 1-lb. Bottles at **36/-** per dozen, the Bottles returnable at **6/-** per dozen; and in Boxes containing three ounces, to retail at **1/-** each, **8/-** per dozen.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 647.] SATURDAY, NOVEMBER 18, 1882. [PRICE FOURPENCE.

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PHARMACY ACT, 1868.

IMPORTANT NOTICE.

The REGISTRAR *appointed for the purposes of this Act has exercised the powers given by Statute for the purpose of enabling him to keep a correct Register, and in so doing has, at intervals of six months, sent notices by registered letters to the persons, and at the addresses appearing in the list at pages* 388–390 *of the* PHARMACEUTICAL JOURNAL *of the* 11*th instant.*

The clause in the Statute under which the notices have been sent is the following:—

"It shall be the duty of the REGISTRAR *to make "and keep a correct Register, in accordance with "the provisions of this Act, of all persons who "shall be entitled to be registered under this Act "and to erase the names of all registered persons "who shall have died, and from time to time to "make the necessary alterations in the addresses "of the persons registered under this Act; to "enable the* REGISTRAR *duly to fulfil the duties "imposed upon him, it shall be lawful for the "*REGISTRAR *to write a letter to any registered "person, addressed to him according to his address "on the Register, to inquire whether he has ceased "to carry on business, or has changed his residence, "such letter to be forwarded by post as a registered "letter, according to the Post Office Regulations "for the time being, and if no answer be returned "to such letter within the period of six months "from the sending of the letter, a second, of similar "purport, shall be sent in like manner, and if no "answer be given thereto, within three months of "the date thereof, it shall be lawful to erase the "name of such person from the Register; provided "always that the same may be restored by direction of the* COUNCIL OF THE PHARMACEUTICAL "SOCIETY, *should they think fit to make an order "to that effect."*

In no instance has the REGISTRAR *received any reply, and in nearly every instance the letters have been returned through the Dead Letter Office.*

The names of all the persons appearing in the list will be erased from the Register on December 31*st next, unless the registered persons communicate with the* REGISTRAR.

The attention of LOCAL SECRETARIES *is especially directed to this notice, as they may, by timely intimations to any of the registered persons known to them, render to those persons important service.*

ELIAS BREMRIDGE,
Registrar.

Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next Evening Meeting will be held on Wednesday, December 6th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the Election of Six Annuitants on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to Elias Bremridge.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first **Tuesdays** in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

WANTED. — The Pharmaceutical Journal for January 11th, 1873, and January 6th, 1877. Full price will be given by the Secretary, 17, Bloomsbury Square, W.C.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

CHEMISTRY AND PHARMACY ..... Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA ..... Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY ..... Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

Application for admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

BENEVOLENT FUND. ELECTION OF ANNUITANTS, DECEMBER, 1882.

YOUR VOTE and INTEREST are solicited in favour of **Mrs. C. M. A. SUTTERBY** (a candidate "approved" by the Council), widow of the late J. N. Sutterby, of Long Sutton, who was a Founder of the Society, as an associate, and for thirty years a member, also for many years an annual subscriber to the Benevolent Fund. Mrs. Sutterby is compelled to seek aid from the Fund by reason of the sudden death of her husband in May last, when his affairs were found so greatly involved that the business, house, furniture, and all other effects had to be sold, leaving the family without any means of support. Mrs. Sutterby's health was greatly shaken by a severe illness some years ago, and she has not the physical strength to earn a livelihood.

The case is personally known to and earnestly recommended by Mr. C. HARVEY, Giltspur Street, London; Mr. G. WEBB SANDFORD, 47, Piccadilly; Mr. SAMUEL GALE, 225, Oxford Street; Mr. GEORGE BOYCE, Chertsey.

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JAMES v. JAMES.—LORD ROMILLY, the Master of the Rolls, on February 23, 1872, declared "that I had an equal right with other members of the Inventor's family possessing the receipt to make and sell this Blister."—R. J. JAMES.

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The London Offices and Warehouse for PETER MÖLLER'S Cod Liver Oil are removed to 43, SNOW HILL, E.C. Chemists willing to use Show Cards, &c., are requested to make direct application. Möller's Cod Liver Oil can be obtained through any Wholesale House or from the London Office.

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ALLEN & HANBURYS are glad to state that they have been able to make arrangements for an important reduction in the price of TONGA. The size formerly sold at **4/6** is now reduced to **2/9**, and larger sizes are put up at **4/6** and **11/-**. Wholesale, **28/-**, **46/-**, and **114/-** per doz. Usual discounts.

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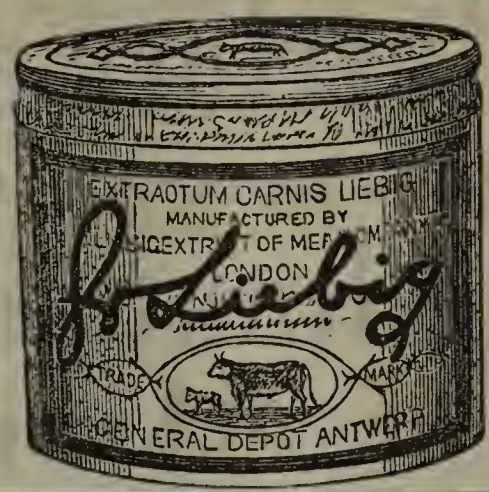

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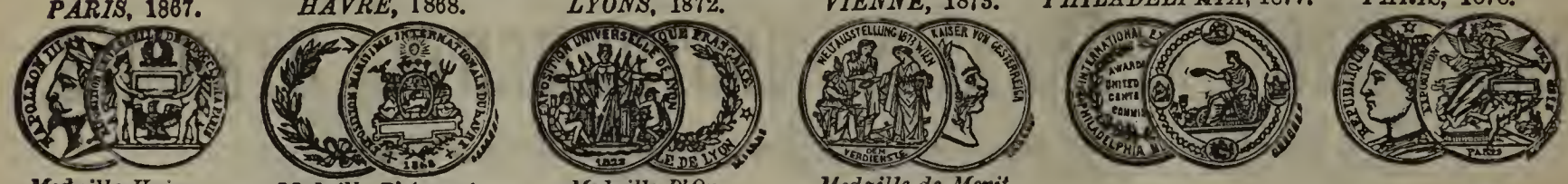

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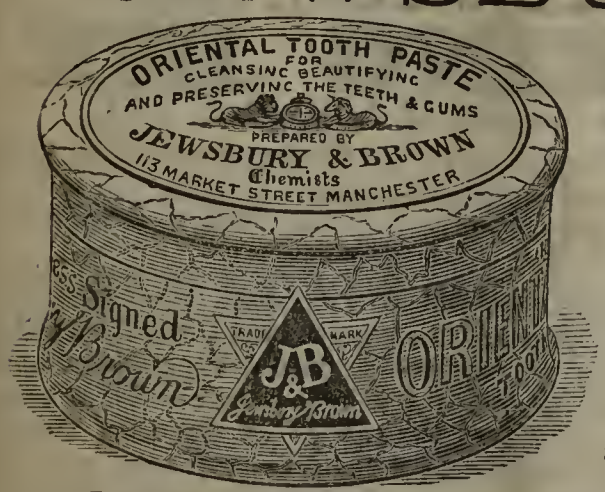

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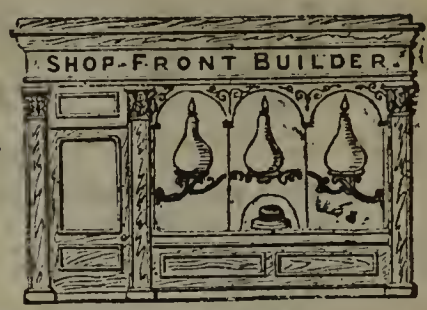

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20 ,,	9 ,,	17/6	20/	21/	23/	,,

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THE SOLUBILITY OF MORPHIA SALTS.*

BY D. B. DOTT, F.R.S.E.

Before describing my experiments on the solubility of morphia salts, it seems desirable to say something on the general subject of solubility, having especially in view the remarks which were made after the reading of my note at the recent meeting of the British Pharmaceutical Conference.

At the outset we ought to have a distinct idea of what is implied by the expression *solubility*. It is too true, as Professor Attfield has said,† that there is a great deal of "haziness and indefiniteness" about this subject, and the sooner the matter is made clear the better. Of the real nature of solution and of what determines and limits solubility, we know very little. When we say that solution results from the attraction exerted between the molecules of different substances, by which a homogeneous liquid is produced, and that the solubility varies with the temperature and pressure, we are stating very nearly all that is known definitely in this department. However that may be, we are at present only concerned with the methods of ascertaining solubilities, the manner of stating the same, and the sources of error appertaining thereto. Generally speaking, such a determination consists of two stages:—

First. The preparation of the solution.

Second. The estimation of the amount of substance dissolved.

Before going further I should like to quote some sentences from Storer, which occur in the introduction to his 'Dictionary of Solubilities.'

"It may be well to remark here that the text-books do not generally lay sufficient stress upon *the preparation of the solution* of the substance under examination, and yet this is the single fundamental point of a correct determination, the other steps of the process being altogether subsidiary, and in general easy of execution as well as comparatively free from sources of error. It is commonly stated that an exactly saturated solution of a salt may be prepared either by exposing a large excess of the salt to the action of the solvent during several hours at the desired temperature (*method by digestion*), or by heating a mixture of the salt and solvent until a strong solution has been obtained at a temperature higher than that at which the determination is to be made, and then cooling the solution to the desired degree, and maintaining it at this point for some time in contact with crystals of the salt, the whole being frequently agitated (*method by cooling*). Now the latter method, though theoretically correct, is in practice peculiarly liable to error, and great care should consequently be exercised in employing it. It is no doubt true, that as regards most substances, the saturated solutions prepared by either method would finally coincide in composition, provided the cooled solution be allow to stand under proper conditions, for a sufficient length of time. Yet it is often exceedingly difficult thus to obtain normally saturated solutions, even of our most common and easily crystallized salts, within the limits of time which can conveniently be allotted to a single experiment. This depends upon the tendency of the solutions of many, if not of most, substances to an indeterminate supersaturation when cooled from a higher to a lower temperation. This supersaturation is not always to be easily detected unless comparative solutions are prepared by the method of digestion, and the length of time required by any given solution to assume the normal condition is a point not readily ascertained. . . . . Indeed it is my opinion, that next to the impurity of the material operated upon, by which many published statements have unqestionably been vitiated, there is no source of error so grave, none which has so seldom been fully guarded against, or so often altogether overlooked, as this tendency to supersaturation.

"On the other hand, in the preparation of solutions by the method of digestion, a difficulty is encountered in the tendency of many substances, like arsenious oxide for instance, to dissolve with extreme slowness; this can, however, be overcome by the exercise of patience, and in any event admits of being detected and controlled. It would, therefore, appear that when practicable the method by digestion should generally be preferred, at least for temperatures low enough to ensure the experiment against the influence of evaporation. The completion of the solution can always be ascertained by determining from time to time the amount of substance dissolved; the operation being considered finished when the results of two of these tests accord with each other."

My own experience thoroughly confirms the general truth of these remarks, although to one expression I must take exception. I do not think that the *method by cooling* is "theoretically correct" any more than it is practically so. It must be remembered that the solubility of a substance in a given liquid at a given temperature means primarily the proportion of the substance which is taken into solution by the solvent at that temperature; and *not* what proportion is retained at the same temperature after the solution has cooled from a higher temperature. If substances in solution did not undergo any chemical decomposition or physical alteration by heating, or even if they immediately returned to their normal condition on the solution cooling, the two methods would yield identical results. When, however, it is observed that many compounds undergo decomposition or suffer some permanent change when their solutions are heated, it is manifest that in their case the method by cooling is quite inadmissible. Solutions of sugar and of aloïn, for example, are so altered by boiling that however long they may be allowed to stand after cooling they will retain a greater amount of matter than if the solution had been prepared by digesting the substance with the solvent at the lower temperature. No doubt some salts undergo decomposition by contact with water at the ordinary temperature. This is the case with some of the alkaloidal salts and to a certain extent with some of the ammonium salts, as was recently well demonstrated by W. W. J. Nicol in a paper read before our Royal Society. The condition of salts in solution is a very interesting subject, but has only an indirect bearing on the question with which we are now engaged, except indeed in those cases where a precipitate is produced when the salt is dissolved. If citrate of caffeine, for instance, dissolves in water to a certain extent, I think it is quite right to take this as the measure of its solubility, whether or not it exists in solution as citrate of caffeine. As a matter of fact our knowledge of the condition of salts in solution is very limited. There is no proof, for instance, that the hydrates in all cases dissolve as such and do not part with their water; and, as was lately ably shown by spectroscopic observation,* changes take place which were formerly not suspected, on mixing solutions of different compounds. In any case, it is obvious that no more accurate method of preparing the solution is known, than causing the solvent to take up the

* Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, November 8, 1882.

† *Pharmaceutical Journal*, xiii., 253.

* *Journ. Chem. Soc.*, xlii., 1018.

maximum amount it is capable of dissolving at the temperature at which it is desired to make the determination. When, however, the "method by cooling" is adopted, the case is very different. As formerly observed, there are instances in which well-marked chemical decomposition takes place upon boiling a solution, and as the substance does not return to its original condition when the solution cools, any results obtained by this process are entirely vitiated. Besides the very common occurrence of the dissociation of hydrates by heating their solutions, physical changes may result, by which the determination is rendered fallacious. In some cases the cooled solution never attains the same composition as a cold saturated solution of the same temperature, and in other instances this result is reached only after a long time. In fine, we can never be sure that a determination made by the "method by cooling" is trustworthy, unless a check experiment is performed by the "method by digestion;" whence it is manifest that the latter method ought always to be employed.

Having prepared the solution, we have next to determine the proportion of substance dissolved. In most cases this can be easily done by evaporating a weighed portion to dryness and weighing the residue. All that is essential is that there should be no loss by volatilization, and that the residue has a known composition. The difficulty involved in a substance being volatile may in many instances be overcome by conducting the evaporation at a low temperature, or in other cases by adding a known weight of some body capable of forming a non-volatile compound. When a substance has to be dealt with, which is not amenable to these methods, perhaps the best plan is to add to a weighed portion of the same, little by little of the solvent from a burette, agitating after each addition, until complete solution is effected. It would be superfluous to discuss all the precautions which experience might suggest to meet special emergencies.

In regard to the sources of error in such determinations, it is important to consider the causes of the great discrepancies which occur in the published statements of solubilities. I have not the least hesitation in giving the first place to carelessness. After making all allowances, it must be admitted that some of the information supplied to us in this department is mere guess-work, or at the best the result of experiments so carelessly conducted as to make them of less than no value. When we see a solubility given as anything between "1 in 4," and "1 in 15," we cannot help feeling that "some one has blundered." Another fertile source of error is the presence of impurities in the materials employed, although I must say that I do not attach the importance to this matter which it has received from others. Generally speaking the amount of impurity at all likely to be present in a substance whose solubility was being ascertained would not seriously affect the accuracy of the result. It is, of course, well known that the solubility of a body is often greatly increased by the presence in solution of a second compound, but as a rule this result is only obtained when the impurity is present in considerable quantity, so that no experiment conducted with reasonable care would be falsified in this manner. I am quite aware that the existence in solution of certain foreign matters greatly influences the crystallization of organic compounds; but this fountain of error would only come into play when the determination is made by the "method by cooling," which we have already condemned. Supposing, then, that every ordinary precaution has been observed in making the experiment, through what sources are errors likely to creep in? I think they are principally two. In the first place there is the variation in physical condition. That is to say, that compounds having the same chemical composition may exhibit divergence in their solubilities on account of some difference in structure. I do not here refer to isomers, which one would expect to show such divergence. We have elsewhere discussed the influence of the amorphous state on solubility. It may be laid down as a general rule that a body is much more soluble in the non-crystalline condition than in the crystalline form, so that if a compound is capable of existing in both forms, it will dissolve far more readily when in the former condition than when in the latter, unless it very rapidly assumes the crystalline state. Thus, salts which have been partially fused are sometimes rendered more soluble than normally. In the next place we have to consider that the degree of solubility is very much affected by variations of temperature. Although this fact is well known, and therefore every care ought to be taken to maintain the solution at a constant temperature up to the time of the determination, in practice it is extremely difficult to do so. No doubt, many of the minor discrepancies in accounts of solubilities are due to the temperature having varied in the different determinations.

As regards the manner of stating the ratio of solubility, it is evident that there are two sides to the question. We may either take as our standard the solvent or the substance dissolved. In some cases the former method, in others, the latter, is the more convenient. We may give the number of parts of the substance dissolved by 100 parts of the solvent, or we may give the number of parts of the solvent required to dissolve unity of the substance. Contrary to the opinion of some authorities, I think the latter method is certainly the simpler and better adapted for the purposes of pharmacy, and it is the one I have adopted. It is true that a solubility is sometimes stated—say, as 1 in 10, the meaning being that 10 parts of the solution contain 1 part of the salt. Unless this method of expressing the facts is explained in each instance, it is only likely to lead to confusion. A much more objectionable—indeed, quite inaccurate system, consists in referring parts by weight to volumes of the same denomination, without stating what is intended. For instance, we may see it stated, that 1 part of salicin is soluble in 60 parts of alcohol; the meaning being, that 1 ounce of salicin is soluble in 60 *fluid ounces* of alcohol. The word "part" always refers to weight, unless it is otherwise stated. Perhaps the pharmacopœial dictum of "solids by weight, liquids by measure," has something to do with this form of erroneous expression.

It now only remains for me to give the results of the experiments which I have recently made on the solubility in water of the better-known morphia salts. The determinations were in all cases made by the "method by digestion," and the values given are believed to be nearly correct. The temperature in each experiment was 60° F., and it is, therefore, not mentioned in the following notes. M signifies $C_{17}H_{19}NO_3$:—

Morphia Hydrochloride.

(1). Solution = 92·06 grs. Residue = 3·18 grs.
3·18 grs. MHCl = 3·71 grs. MHCl.3 H_2O.

$$\frac{92{\cdot}06 - 3{\cdot}71}{3{\cdot}71} = 23{\cdot}81$$

(2). Solution = 78·94 grs. Residue = 2·71 grs.
2·71 grs. MHCl = 3·16 grs. MHCl.3 H_2O.

$$\frac{78{\cdot}94 - 3{\cdot}16}{3{\cdot}16} = 23{\cdot}98$$

(3). Solution = 128·54 grs. Residue = 4·44 grs.
4·44 grs. MHCl = 5·18 grs. MHCl.3 H_2O.

$$\frac{128{\cdot}54 - 5{\cdot}18}{5{\cdot}18} = 23{\cdot}81$$

(4). Solution = 164·92 grs. Residue = 5·65 grs.
5·65 grs. MHCl = 6·59 grs. MHCl.3 H_2O.

$$\frac{164{\cdot}92 - 6{\cdot}59}{6{\cdot}59} = 24{\cdot}02$$

Note.—These determinations were made with different samples. The mean result is:—1 part of the salt soluble in 23·9 parts water.

Morphia Sulphate.

(1). Solution = 118·44 grs. Residue = 4·62 grs.
4·62 grs. $M_2H_2SO_4.2H_2O$ = 4·95 grs. $M_2H_2SO_4.5H_2O$

$$\frac{118{\cdot}44 - 4{\cdot}95}{4{\cdot}95} = 22{\cdot}92$$

(2). Solution = 127·31 grs. Residue = 4·91 grs.
4·91 grs. $M_2H_2SO_4.2H_2O$ = 5·28 grs. $M_2H_2SO_4.5H_2O$

$$\frac{127{\cdot}31 - 5{\cdot}28}{5{\cdot}28} = 23{\cdot}11$$

(3). Solution = 119·98 grs. Residue = 4·64 grs.
4·64 grs. $M_2H_2SO_4.2H_2O$ = 4·99 grs. $M_2H_2SO_4.5H_2O$

$$\frac{119{\cdot}98 - 4{\cdot}99}{4{\cdot}99} = 23{\cdot}04$$

(4). Solution = 100·21 grs. Residue = 3·89 grs.
3·89 grs. $M_2H_2SO_4.2H_2O$ = 4·18 $M_2H_2SO_4.5H_2O$

$$\frac{100{\cdot}21 - 4{\cdot}18}{4{\cdot}18} = 22{\cdot}97$$

Note.—As with the muriate, these results were obtained from different samples. The mean of the four determinations is:—1 in 23·01.

Morphia Acetate.

(1). Solution = 70·01 grs. Residue = 15·20 grs.
15·20 grs. M. = 21·28 M.$C_2H_4O_2.3H_2O$

$$\frac{70{\cdot}01 - 21{\cdot}28}{21{\cdot}28} = 2{\cdot}28$$

(2). Solution = 55·50 grs. Residue = 12·085 grs.
12·085 grs. M = 16·91 grs. M.$C_2H_4O_2.3H_2O$

$$\frac{55{\cdot}50 - 16{\cdot}91}{16{\cdot}91} = 2{\cdot}28$$

(3). Solution = 94·26 grs. Residue = 18·59 grs.
18·59 grs. M = 26·02 grs. M.$C_2H_4O_2.3H_2O$

$$\frac{94{\cdot}26 - 26{\cdot}02}{26{\cdot}02} = 2{\cdot}62$$

(4). Solution = 86·07 grs. Residue = 16·88 grs.
16·88 grs. M = 23·63 grs. M.$C_2H_4O_2.3H_2O$

$$\frac{86{\cdot}07 - 23{\cdot}63}{23{\cdot}63} = 2{\cdot}64$$

(5). Solution = 106·67 grs. Residue = 22·03 grs.
22·03 grs. M = 30·84 grs. M.$C_2H_4O_2.3H_2O$

$$\frac{106{\cdot}67 - 30{\cdot}84}{30{\cdot}84} = 2{\cdot}45$$

(6). Solution = 86·13 grs. Residue = 17·86 grs.
17·86 grs. M = 25·00 grs. M.$C_2H_4O_2.3H_2O$

$$\frac{86{\cdot}13 - 25{\cdot}00}{25{\cdot}00} = 2{\cdot}44$$

Note.—The acetate is the most unsatisfactory salt to work with, on account of the difficulty in having it perfectly neutral. The determinations (1) and (2) were made with the ordinary salt, which contains an excess of morphia. (3) and (4) were performed with a specially prepared salt, which was as nearly neutral as possible. These results ought therefore to be the best. (5) and (6) are determinations made with solutions containing considerable excess of acid. The mean of the six experiment gives the solubility:—1 of acetate in 2·44 of water.

Morphia Tartrate.

(1). Solution = 105·04 grs. Residue = 9·15 grs.
9·15 grs. $M_2C_4H_6O_6$ = 9·83 grs. $M_2C_4H_6O_6.3H_2O$

$$\frac{105{\cdot}04 - 9{\cdot}83}{9{\cdot}83} = 9{\cdot}68$$

(2). Solution = 130·185 grs. Residue = 11·325 grs.
11·325 grs. $M_2C_4H_6O_6$ = 12·17 grs. $M_2C_4H_6O_6.3H_2O$

$$\frac{130{\cdot}185 - 12{\cdot}17}{12{\cdot}17} = 9{\cdot}69$$

Note.—The solubility may therefore be taken as 1 part of neutral tartrate in 9·7 parts of water.

Morphia Meconate.

(1). Solution = 189·36 grs. Residue = 4·86 grs.
4·86 grs. $M_2C_7H_4O_7$ = 5·42 grs. $M_2C_7H_4O_7.5H_2O$

$$\frac{189{\cdot}36 - 5{\cdot}42}{5\ 42} = 33{\cdot}93$$

(2). Solution = 158·63 grs. Residue = 4·07 grs.
4·07 grs. $M_2C_7H_4O_7$ = 4·54 $M_2C_7H_4O_7.5H_2O$

$$\frac{158{\cdot}63 - 4{\cdot}54}{4{\cdot}54} = 33{\cdot}94$$

Note.—These determinations were made with the same sample. They are the only values which differ considerably from those I formerly gave. This result I attribute to the fact that the crystals used in these last experiments were dried by exposure to the air for a short time, while the salt employed in the older experiments was probably over-dried with the aid of heat. The mean of the determinations makes the solubility of the meconate 1 in 33·9 of water.

Since writing the foregoing I have noticed a paper,* by V. Coblentz, on the "Solubilty of Commercial Sulphates of Morphine," which calls for some attention. This pharmacist follows the process of Professor Power, which consists in estimating the sulphuric acid in the solution, and then calculating the equivalent amount of morphia sulphate. It is hardly necessary to say, that we have here a method which is only admissible when the sulphate is pure. If the salt were to contain free sulphuric acid, or a sulphate having a different proportion of acid from sulphate of morphia, the results would be to a greater or less extent erroneous. Mr. Coblentz falls into the same mistake as Professor Power, in so far as he finds the solubility of the sulphate in water by dividing the weight of the solution by the weight of the salt dissolved. This gives the ratio of salt to solution, not of salt to solvent. According to the results given, samples of sulphate from different makers require for solution from 18 to 24 parts of water. No doubt by the presence of certain impurities in small quantity, or from the salt having been over-dried, the solubility of the sulphate will be appreciably increased; but I can scarcely credit that any sample in the market would dissolve in 18 parts of water at 15° C. Regarding what has been remarked of the "variable nature of solubility," I just wish to say that I do not believe that in any true sense of the words there is the least variation about it. If I or others should use impure materials, or make bad observations, the results will doubtless vary; but, given a pure compound and properly performed experiments, the results will always be the same.

* *Pharm. Journ.*, [3], xiii., 330.

I conclude by giving a table showing the solubility of the morphia salts as above described.

The Solubility of Morphia Salts at 60° F.

Acetate . .	1 part is soluble in		$2\frac{1}{2}$	parts water.
Tartrate . .	,,	,,	$9\frac{3}{4}$	,,
Sulphate . .	,,	,,	23	,,
Hydrochloride	,,	,,	24	,,
Meconate .	,,	,,	34	,,

THE BEST FORM OF ADMINISTERING PUMPKIN SEED.*

BY L. WOLFF, M.D.

What is the best form of administering the seed of the pumpkin (*Cucurbita Pepo*)?

For the object of this query, to obtain in a pharmaceutical preparation of the seed of *Cucurbita pepo* the best possible results in the most palatable and effective manner for the expulsion of tape-worm, it is absolutely necessary that we should be well acquainted with the drug itself and its proximate constituents, in order to ascertain to which of these it owes its peculiar tænifuge power.

This property seems to be inherent not alone to the common pumpkin (*Cucurbita Pepo*), indigenous to our country, but also to other species of the cucurbitaceæ, such as *Cucurbita occidentalis* of the West Indies, and *Cucurbita maxima*, Duch., and others.

Pepo, though well known for ages as a domestic anthelmintic and tænifuge, was brought to the notice of the profession in 1845, by Brunet, who reported twenty-five or thirty successful cases of tænia treated with it.

Others have since then used this article largely for the same purpose, but only with varying success, as the action of any drug cannot be determined without a thorough knowledge of the principle or principles to which it owes its peculiar efficacy. These must be closely studied before a rule can be laid down for its use, with a view to its uniform action.

Pepo has been repeatedly examined and investigated by many able authorities, but the results have at all times been conflicting as to the nature of its active ingredients. Its general constituents have been uniformly established as fixed oil, starch, cellulose, pectin, and protein compounds. Free fatty acids, sugar, resin, and even a glucoside, have also been claimed to exist therein. To test this latter, I have made an extensive series of experiments, in order to be able to either verify or disprove them. As none of the former ingredients can be viewed as tænifuge in its nature, and this drug itself is such in a marked degree, the inference is that a peculiar principle exists in it to which it owes its remedial property.

Dorner and Wolkowtch (1870) claimed to have discovered in pumpkin seed an alkaloid, which they propose to call cucurbitin (cucurbita?) but which both as an alkaloid, as well as a glucoside, Kapylow (1876) has failed to establish. Slop attributes its action to the oil, of which he gives a description in the *Pharmaceutische Centralhalle*, but advises the use of an electuary of the seed as a tape-worm remedy.

Herard thinks its active principle resides in the kernel, and Lelievre in the gemmule.

Heikel maintains that it is contained in the menisperm, and, to prove it, has given this exclusively, with good effect. Of the resin extracted from it, he gave 75 centigrams in six pills, expelling the tape-worm. This amount would represent 17 grams of the green membrane or 250 grams of peeled seed. In further experiments, about 6 ounces of the perisperm, tegumentum, and testæ were given without result, while 1 ounce of the membrane surrounding the embryo expelled the parasite.

This membrane was found to consist of two layers, the outer of which contained a quantity of resin (one in seventeen).

As opinions of investigators on this subject are so much divided and with a view of presenting a definite answer to this query, I was led to experiment personally, going over the entire field in numerous experiments and observations.

While I found my results to correspond with the nature and quality of the general constituents, I am slightly at variance with Slop and Kapylow in regard to the oil. While I found it to be a glyceride of oleic, palmitic, and myristic acids, I could not detect at any time any free fatty acids in the recently dried seed; nor could I confirm the fractional solubility of the oil in alcohol, and must attribute their results to the spontaneous decomposition of the oil in old seed into fatty acids and glycerine.

While they assert that the expressed oil possessed tænifuge properties, I have not been able to verify this; nor have I observed it in the oil of pepo, which was extracted with petroleum benzine, but found it markedly so in oil extracted with ether or chloroform.

My experiments for the separation of an alkaloid or glucoside have also been unsuccessful, and I must side with Kapylow in claiming an absence of either of these. I arrived, therefore, by exclusion to entertain the views of Heikel as to a resin forming the active principle of the seed, and extended my experiments in that direction. I exhausted a quantity of recently dried and well-comminuted seed with petroleum benzine, previously proven not to extract the active ingredient, and the residue was repeatedly treated with ether, chloroform, and alcohol. The product on evaporation of the menstruum was a soft resin of a greenish brown colour and acrid bitter taste, reminding of the oleoresin of male fern in that respect. Oil which had been extracted with ether or chloroform yielded, on shaking with stronger alcohol, a similar substance. This resin administered in 15 grain doses, certainly possessed tænifuge properties, and I was thus led to regard it as the active principle of pepo. It would seem from this that stronger alcohol is the proper menstruum for preparations of this drug. As the resin, however, as well as the fluid extract, did not prove laxative in my observations, and the alcoholic strength of the latter besides would contra-indicate, in the doses required, its use for children, I examined the emulsion of the seed to determine if, and in what quantities, it contained the resin. I evaporated to this end an emulsion of the seed to dryness and treated it with stronger alcohol, which, after filtration, left on evaporation, a corresponding quantity of the resin, which had evidently been emulsified in the process.

I would, therefore, in answer to the above query, recommend as the most desirable and effective preparation for administering the seed of "*Cucurbita Pepo*" for adults:

First. Fifteen grains of the above-mentioned resin in pill form.

Secondly. One to 2 fluid ounces of the alcoholic fluid extract in broken doses and largely diluted; both of these taken fasting in the morning and to be followed two or three hours afterwards by a dose of castor oil; or better than either of these for children, an emulsion of 1 ounce of the recently dried and finely comminuted seed, and $\frac{1}{2}$ ounce of granular sugar, with 4 ounces of water, in which preparation the natural oil acts as a mild laxative; this to be also taken in broken doses, following closely on each other after a fast of six to eight hours.

The electuary, formed by pounding the decorticated seed into a pulp with sugar, has proved with me not alone unreliable, but presented in many cases serious obstacles to deglutition.

* From the 'Proceedings of the Pennsylvania Pharmaceutical Association,' 1882.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 18, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BOARD OF TRADE ON THE WEIGHTS AND MEASURES ACT.

AMONG the Parliamentary papers issued during the past week is a Report recently made to Parliament by the Board of Trade as to its proceedings and business under the Weights and Measures Act, 1878. It is satisfactory to learn from this Report that since the date of the previous one no question of importance has arisen with reference to the verification and stamping of the weights and measures used by chemists and druggists, and that in this respect the Act appears to be working satisfactorily. But the Report mentions that a "pharmaceutical chemist" in Edinburgh has been "fined for having unstamped weights used in dispensing poisons," and it further quotes a statement of the St. Pancras inspector that he recently visited thirty-six chemists' shops and in nearly every instance found weights that were unjust or incorrect. It does not, however, appear from the Report whether in these last-mentioned cases the weights alleged to be incorrect were also unstamped, although it must be obvious that the culpability or non-culpability of the persons in whose possession incorrect weights or measures may be found must depend very much upon whether they have complied with the law as far as can be reasonably expected, and secured the verification of an official inspector as to their correctness. This proper and safe course is, we regret to say, not so universally followed as might be expected, and only recently we received a semi-official notification, through a gentlemen who is himself a chemist and druggist, that a large number of chemists and druggists in a certain metropolitan district had up to that time failed to have their weights and measures stamped in accordance with the provisions of the Act passed four years ago, and seemed bent upon compelling the local authority to undertake the unpleasant task of commencing legal proceedings against them for their default. If this be a fact, and the result of sheer neglect, persons thus omitting to bring themselves within the conditions prescribed by law will have only themselves to blame for possible annoyance and ignominy such as are sure to be associated with any charge of being in possession of false weights or measures, since it cannot be said that, as a rule, undue harshness or haste has been shown in the enforcement of this Act. But it may be that some of the weights referred to are used solely in dispensing, and that the persons using them are of the same opinion as a correspondent, whose letter appears this week on another page, that the dispensing counter ought to be exempt from the inspector's visits. This contention will, no doubt, have the sympathy of many of our readers, and the question whether an attempt should be made to secure such an exemption authoritatively is one well worthy of consideration. Meanwhile the prudence of acting as if this exemption already existed appears to us to be very doubtful, for even if it were held that the dispensing and supply of medicines is not of the nature of a trading transaction, it would be difficult for a chemist and druggist to prove on every occasion that weights and measures, kept as a rule in the same shop where trade is carried on, are never used for any other purpose than dispensing.

Other points in this Report are also worthy of notice. It appears that serious complaints have been made to the Board by persons who have been required to have weights and measures, of which the accuracy was not questioned, restamped by the inspectors of the districts in which they were used. It seems strange that the plain provision of section 45 of the Act,—that a weight or measure "shall not be liable to be restamped because used in any place other than that in which it was originally stamped,"—should be thus ignored; but instances of this propensity of inspectors are known to be numerous, and it may be hoped that the official opinion now expressed may help to keep it in check. Questions have arisen as to the mode of stamping iron weights, which usually bear the verification stamp on the plug of lead or other metal by which they are adjusted, but which are sometimes meet with having more than one adjusting plug, each of which is stamped. This latter practice, it is pointed out, is bad, and hardly in accord with the words of the Act, which refer to "a plug." Inquiries have also been made as to the marking and stamping of earthenware measures, which is sometimes carried out by submitting them to the inspector while in the green state and again after firing, and the Board expresses approval of this practice, provided all that prove to be incorrect after firing are either destroyed entirely, or have the verification marks completely effaced. In addition, the subject of false statements of weight or measure placed on made-up parcels of goods exposed for sale has been under the consideration of the Board, and an opinion has been expressed that, except in respect to certain articles and localities which are the subject of special legislation, the proper remedy would lie at common law and that the Weights and Measures Act does not deal with offences of this kind.

As science advances and commerce extends fresh demands are made upon the Department for the

creation of new standards, and its attention has been called during the past year to the expediency of adopting, among other things, photometric standards for gas and also to possible means of measuring electricity. It is not quite clear, however, under what section of the Weights and Measures Act authority will be found for undertaking work of this kind, or at any rate for enforcing generally the use of such standards if created, although similar power is to some extent vested in the Board of Trade in connection with various Gas Acts. But probably an extension of this power would be readily conferred by Parliament, as in the case of the petroleum-testing apparatus, under the Petroleum Act, and indeed a hope is expressed that an opportunity will shortly be afforded of laying before Parliament a Bill for consolidating and amending the enactments for regulating measures used in the sale of gas and of dealing with the mode of testing the illuminating power of gas. In connection with the Petroleum Act it is mentioned that an omission has been pointed out by Dr. FOERSTER, the Director of the Imperial Standards Commission of Germany, in the rules for testing petroleum, where no allowance is made for variations of atmospheric pressure at the time of determining the "flashing point" of an oil. The necessity for such an allowance is shown by the fact that some oils recently tested in London, when the barometric pressure was equal to 29·80 ins., showed flashing points of 89° and 74° F. respectively; but when tested at Buxton, with the barometer at 28·35 ins., the same oils flashed at 86° and 72° F., so that the oil that would have passed in London, as flashing at 74°, would have been condemned at Buxton, as flashing at 72° F., or one degree below the legal standard.

A brief but not very encouraging reference is made in the Report to the metric system. Beyond the verification of metric standards for scientific purposes and the issue of new cards of equivalents of imperial and metric weights and measures there have been no important proceedings or inquiries with reference to it. On the other hand, in Turkey the metric system of weights and measures came into operation, under a decree of the Sultan, on the 1st of March last.

In the appendix are given lists of the counties, boroughs, etc., that have adopted the uniform stamp of verification suggested by the Board of Trade, with the distingushing number of each, as well as *facsimiles* of the special designs adopted by other local authorities.

THE EXTRACT OF MEAT CASE.

THE full report of Mr. Justice FIELD'S judgment in this suit proved to be so very lengthy that we have felt constrained to omit a few passages; but everything material has been preserved, and for all practical purposes the judgment may be considered to be given *in extenso*. It will be seen that the result of the judgment is in favour of the public, and opposed to the virtual monopoly which must have resulted from any decision which protected, in favour of a prosperous and wealthy company, exclusive use of the name of a commercial article.

In reading the judgment it is somewhat startling to find that the invention is attributed, by the Company, not to the late Baron JUSTUS VON LIEBIG, but to the French chemist, PROUST, and dated as far back as the commencement of the century. The judgment does not disclose the authority for so attributing the invention, but the statement was made by Dr. MAX VON PETTENKOFER, who gave evidence in the case, in the course of which he said that prepared extract of meat was first invented by PROUST, an eminent French chemist, in the year 1801, and that, therefore, LIEBIG was not the real inventor of extract of meat. Dr. PETTENKOFER added further, that the process of making what is now in England called LIEBIG'S Extract, was, on the whole, the same as that known to PROUST.

The curiosities of litigation are various, but it certainly is surprising to find that the eminent chemist, Baron JUSTUS VON LIEBIG, who undoubtedly did take credit for presenting to the world a very important discovery and desired that the extract of meat should be called by his name, should appear to have stipulated with the Fray Bentos Company for 2 per cent. of its profits during a period, and it is not less surprising that long after his decease his colleague and bosom friend should come to this country and in a witness box divert from him to a French chemist whatever honour may attach to the discovery.

MUNICIPAL HONOURS.

WE notice that among the gentlemen who have recently been chosen to fill the office of Mayor there are several who are connected more or less with pharmacy. At Bolton, Mr. E. G. HARWOOD, who is still a member of the Pharmaceutical Society, although now out of business, has been chosen; at Brighton, Mr. A. H. COX has been elected; at Denbigh, Mr. J. H. JONES; at Dorchester, Mr. H. DURDEN; at Hartlepool, Mr. JOHN HORSLEY (re-elected); at Leominster, Mr. MICHAEL J. ELLWOOD (re-elected); at Lymington, Mr. HENRY BADCOCK; and at Peterborough, Mr. J. WHITWELL. In addition, Mr. T. W. ATKINSON has been appointed Sheriff of the Town and County of Poole, and in Scotland Mr. J. HARVIE has been elected Senior Magistrate of Airdrie.

CHEMISTS' ASSISTANTS' ASSOCIATION.

WE learn that on Wednesday evening next, the 22nd inst., the above Association will hold a Conversazione in the Banqueting Room, St. James's Hall, in connection with which there will be an exhibition of electrical apparatus, microscopes, etc., and rare chemicals.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The first meeting of the twenty-ninth session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday, November 8, at 8.30 p.m.

Mr. Alexander Napier, President of the Branch, in the chair.

The minutes of the last meeting of the previous session having been read and confirmed, Mr. Napier read the following—

Presidential Address.

Gentlemen,—I have, in the first place, to thank my brethren in Council for the honour they have done me in electing me their chairman for the present year. In taking the chair I must rely on your kindness and assistance as I humbly endeavour to discharge its duties, and I am encouraged by the assurance of support from Mr. Nesbit, who has kindly given his services for another year as Vice-President, and I rely on the help of the other members of Council. You know, gentlemen, it is no easy task to come after Mr. Stephenson, who has discharged the duties of this chair so admirably for these five years past. I cannot lay claim to either his qualifications or experience; but such abilities as I have are freely at your service. It shall be my endeavour to keep before me the interests of the North British Branch of the Society and to discharge the duties of this chair so that at the close of the year we may all have the satisfaction of finding that it has been a successful one.

In accordance with time-honoured custom I venture to offer a few opening remarks.

Perhaps the most noteworthy incident in the course of the year, in the world of pharmacy, outside the operations of our Society, was the meeting of the Pharmaceutical Conference, at Southampton, in August, under the able Presidency of Professor Attfield. His opening address was a masterly presentation of various aspects of pharmacy in this country, which were happily grouped under the departments of collection, preparation, and distribution. This address alone will stamp the recent Conference as probably the most memorable which has yet taken place. The scientific papers read and discussed are all valuable contributions to our scientific knowledge. The Conference gave another opportunity for the expression of mutual friendship and goodwill among the members of our common calling. Pharmaceutical gatherings have also been announced in Germany, Austria, and America; and invitations issued to members of other pharmaceutical associations to take part in them. The importance of these gatherings cannot well be over-estimated, whether we consider them in their scientific or social aspects.

I may refer to another set of scientific meetings, less pretentious, but well worthy of our regard—the Edinburgh Chemists' Assistants' Association, inaugurated for the fifth session in this place a month ago. The opening address delivered by their President and the programme of papers promised augur well for the success of the Association during the session. This Association has done good work in the past, and should be taken advantage of by all young men who are able to attend the meetings. In this and similar associations young men are not only educated, but are gradually drawn on to take part in the discussions of the subjects, and the habit is acquired of submitting to paper thoughts upon matters requiring investigation or upon which there are differences of opinion, and courage is gained to express these thoughts in public. These associations of junior pharmacists are nurseries from which the Pharmaceutical Society may confidently hope to draw valuable workers. They give substantial evidence that so far as the scientific meetings of the Society are concerned all the material required for their maintenance may be found within our borders. Among the members of this Association I see the names of some gentlemen whose qualifications are well known to all of us. I am sure I am right in saying it will gratify the Council to find these gentlemen taking part in the Evening Meetings of this Society as well. This remark need not be restricted to those who reside in Edinburgh, but should extend to all who have been associated with us, whether in Edinburgh or not. From time to time members are passing away from us. It is only by the younger men being alive to their duty and coming forward to take the vacant places that the prosperity of pharmacy and of this Society can be ensured.

As pharmaceutical education and examination are destined by a recent decision of the Council in London to receive greater prominence and to be more closely allied to each other than they have ever been in Great Britain, this subject may be said justly to occupy the foremost place in interest with the Society at this time. I am, therefore, induced to give it a place in my remarks this evening.

Pharmacy, to be seen aright, must be looked at as one of the departments of progressive medical science. It is only there the extent of its educational requirements can be estimated. Medical science now demands of those who pursue it enlightened and exact knowledge of the nature and causes of disease and of the methods of treatment. It is important for us to notice how the work of acquiring this knowledge is gone about. It is systematic, comprehensive, and thorough. It is carried on under the best training that can be procured and is tested periodically as it proceeds.

When medicine came to be prosecuted on thorough scientific principles it was found to be expedient to relieve students and practitioners of medicine from the more mechanical and routine duties of collecting, compounding, and dispensing drugs. The expediency and utility of this separation is witnessed to by the special position of pharmacy being now almost universally recognized. The ever-increasing demands upon practitioners of medicine for exact knowledge of the causes and nature of disease and for intelligent action in counteracting it, appeal for increased scientific knowledge in pharmacists.

Medical science, not satisfied with present attainments, is ransacking every repository of knowledge in quest of agents to combat the diseases common to men and animals. This science holds in Britain a distinguished place because of the thoroughness of instruction in our medical schools, the ability of its teachers, and the number of students who willingly devote their energies of mind and body to the mastery of the studies assigned to them.

Aware of the importance of thorough instruction, the State has declared for curriculum in elementary and general knowledge, by giving its awards according to results ascertained by attendances and examination.

The recent resolutions of our Council prescribing a compulsory curriculum to be imposed on all persons who are to have any legal standing in pharmacy is designed to ensure in the pharmacists of the future in this country such an amount of familiarity with the principles and facts relating to pharmacy as shall make them theoretically as well as practically masters of their art. The standard of knowledge for students of pharmacy in this country ought not to be behind the average standard in other countries. It should not be set at the point where acquaintance with the routine of pharmaceutical details and mechanical compliance with defined instructions is guaranteed. This is the more necessary from the growing objection to large doses of crude forms of medicines, and the corresponding tendency to eliminate all inert matter and administer medicines in the highest possible state of concentration. Errors in dispensing increase in proportion to the concentration of the drugs, and call for

intelligent knowledge of their nature and properties in those who compound and dispense them.

There is also a wide field of labour, not more than fairly opened up, lying before the rising generation of pharmacists. There is a vast amount of work valuable to medical science and to pharmacy which can only be carried on to purpose by men who prepare themselves for it by liberal scientific instruction. This the compulsory examination under the Act of 1868 has hitherto failed to accomplish. The Council of the Society, after much observation and experience, came to the conclusion that the proposed curriculum is not only desirable but necessary. The Examiners found in very many cases that the general mode of preparation for examination in the special subjects of scientific study was imperfect and not founded upon any systematic or comprehensive plan.

Examination of itself revealed the fact that the knowledge hitherto acquired by many candidates was too superficial and too hastily imbibed to exercise a permanent influence on the reflecting powers; that it had been taken in in too crude a form for assimilation. The remedy which the Council have sought out and adopted for the purpose of rectifying this state of things begins with a compulsory examination in elementary knowledge before entering on apprenticeship. By adopting this measure the greatest hindrance to pharmaceutical study and progress will be taken out of the way.

Next to a compulsory Preliminary examination before apprenticeship, the Council has decided for compulsory and systematic instruction in theoretical chemistry, botany and materia medica, with practical instruction in chemistry. No one can doubt that this is the best means of insuring thoroughly intelligent agents for the general work of our profession, or that the highest interests of pharmacy and medicine can well be secured without it. Pharmacy in Britain, as shown by Mr. H. J. Möller, in his "Remarks on Modern Pharmaceutical Study," in the *Pharmaceutical Journal*, pp. 160, 258, and 379, vol. xii. (1881–82), and by Professor Attfield, in his able pamphlet on 'Education and Examination,' stands alone, in respect that it has as yet made no compulsory demand upon its students for systematic public instruction.

The average time devoted to general pharmaceutical education on the Continent may be said to be about three years, subsequent to three years of practical work in a pharmacy. The time must come when pharmaceutical students in Great Britain also will have to devote a certain time exclusively to scientific education. The present system, or no-system, of having an engagement in a pharmacy and attending lectures and studying privately in by-hours is unsatisfactory to the students and to their employers. It involves loss to both. The progress made in recent years in many branches of art is largely due to the application of chemistry and physics. Those who are to direct these require to take public instruction in chemistry and physics. Chemists and druggists may then fairly be expected to know something about chemistry, and may also be supposed to be able to turn such knowledge to practical account—be able to make it commercially valuable. It is only reasonable, too, that those who are to prepare and distribute poisonous drugs should understand materia medica, and botany so far as it relates to materia medica. In a word, what the rest of Europe and America has not only decided should be done, but is doing, Britain cannot but comply with; especially when the thing about which there is unity of action is education. In the words of Matthew Arnold, "Europe is to be regarded as now being, for intellectual and spiritual purposes, one great confederation bound to a joint action, and working to a common result."

Only to those who have received years of public instruction is the work of pharmacy entrusted on the Continent; and to persons possessed of such qualification only is it intended to delegate the distribution of poisonous drugs in Britain. The course of public instruction required by the Council is stated to qualify for the "Minor," and differs little from that for "Graduates in Pharmacy" in Europe and America. In the meantime, no more extended and comprehensive course is announced as a "Major" standard for "Masters in Pharmacy" or "Pharmaceutical Chemists."

Pharmaceutical students have to remember, in view of the demands made upon them, that all other professions affecting culture can only be entered by the portal of a special training. Those who enter the drug business in future without complying with the compulsory requirements of the curriculum must be prepared to remain permanently in a subordinate position without the power of becoming principals.

It has been said that expediency dictates that curriculum should be introduced gradually, rather than all at once. The proposal of Professor Attfield was that a public system of pharmaceutical education should be arranged to meet the practical needs and requirements of a not too remunerative calling: a public system tentatively and gradually applied at first it may be to the Major only. Past experience points the other way. The Medical Act of 1858, the Education Act, the Act affecting Law Agents, the Dentists Act, and others, were introduced at once, with due regard to existing interests. The changes proposed by our Council may have to be introduced in the same way.

Experience fortunately proves that increased stringency of admission to the before-named professions has in no way diminished, but, on the contrary, has augmented the number of candidates, and the quality of brain-power offered. The necessity for advance in education is admitted on all hands. Its importance to pharmacy cannot be over-estimated.

This being a uniform experience, pharmacy should form no exception. By making the whole course of instruction at once compulsory, better provision may be made for imparting it; and students would have at once to devote a year or more to public training. If the course of instruction may be taken at intervals, to allow of students engaging in practical pharmacy, then it will be desirable to divide the examinations for the "Minor" into two sections, giving two chances to pass in all subjects, and in the case of failure, to impose a fresh course of study in the subjects in which they are deficient.

It is doubted by some whether a sudden withdrawal of entrants who aim at taking a first place in pharmacy may not result in the need for the introduction of unskilled labour in greater amount than heretofore into practical work. While they see the necessity for an advance in the amount of scientific knowledge which pharmacists should possess, up to, and even beyond what is to be required by the curriculum, they have a fear that while the qualification is being elevated at the one end it may be lowered at the other. It is to be hoped that the labour necessary for the work of pharmacy may suffer no depreciation in intelligence by a sudden introduction of curriculum.

The aim of all legislation relating to pharmacy, whether by the State or the Executive of the Pharmaceutical Society, is to render it more than ever a potent and reliable factor in public health.

But, now that compulsory curriculum is to be a fact, the consideration is not so much as to the drawbacks attendant on its introduction, for in time these will adjust themselves. It is more important to consider by what agency the work of public instruction is to conducted. Where? By whom, and at what cost? and to be assured that when the results of the new system become visible it will be found that pharmacy is a better aid to medicine; that pharmacists better perform their duties to the public; that they are more respected and better remunerated for their services. There is no doubt the Committee entrusted with the maturing of the details of the compulsory measure will devise

means to meet the occasion; as they may be presumed to be fully alive to the situation, and to the necessity for increased facilities for obtaining sound education. This work may have to be commenced at first in some of the leading centres. In Germany pharmaceutical education is conducted in twenty different Universities, viz., at every University in the State. Our model school in Bloomsbury Square is invaluable; but to very many young men engaged in pharmacies, even in London, it is inaccessible under present circumstances. When, however, practical work has to be abandoned for a season, for the right fulfilment of the course of public instruction, students will most consult their own good and that of pharmacy by repairing to the most thoroughly equipped school. Apart from the superior advantages of the school, there will be an opportunity, perhaps with many the only opportunity, of studying men and things in the greatest centre of human influence at the present day; an experience which would be of life-long value.

The wants of the provinces may be met by arranging for the necessary instruction being given in some of the principal centres of population: in Edinburgh, Glasgow and Aberdeen, for example, so far as Scotland is concerned. And the teachers, for the most part, will have to be the teachers in existing schools of medicine, or persons who have been trained in pharmacy schools at home or abroad.

The questions are put, "Will the Society institute such instruction?" and, "Can the funds of the Society subsidize public education in pharmacy?" In other professions students have to bear the cost of their public instruction, except in the cases of those who obtain bursaries. The Pharmaceutical Society may have to consider how far it can in this way aid higher education.

In the general absence of pharmacy schools in the past throughout the country, it is not to be wondered at that outsiders should, from a commercial point of view, have set themselves to meet the demands for preparation for examination; neither need it be wondered if only as much meat is put into the pie as will stave off present requirements and yield a good return for the undertaking.

It need not be surprising, either, that pharmaceutical students whose time is taken up with practical business, and who cannot well afford to throw themselves out of employment, should run to the shop where the ready-made article can be obtained, even if it is known to be unsatisfactory and ill adapted to the purpose of an education, which after-experience demonstrates to be a misfit. Pharmaceutical students have hitherto been placed in an unfair position in this respect, and are entitled to sympathy more than censure in seeking out the short cut to a pass in examination, injurious as it is in every respect.

Had time and circumstances permitted, I might have considered this subject as bearing on the questions of apprenticeship, remuneration, and the supply of drugs in thinly populated districts, when the people's medicine man,—the old chemist and druggist,—imperfect as he is, may give place to a yet more imperfect packet system of supply—imperfect because of the perishable nature of drugs. I might also have spoken of the pharmacist as the custodier of poisonous drugs, and of the right of the people to demand the intelligence of the seller in purchasing them. But I am satisfied that the most experienced and judicial minds have been, and still are, engaged in the consideration of these matters. I should not have thought of enlarging on the subject of curriculum, after the very full consideration it received when brought before you by my predecessor in his opening address last session, were it not to keep it before the minds of our younger brethren, whom it will certainly most affect. Last year it was a thing of contemplation; this year it has matured into fact in all but its details. The resolutions of the Council vitally concern the whole constituency. It is, therefore, desirable that they be kept before the notice of the Society and the public; and that they be heartily endorsed by us all. I, for one, will rejoice to know that those who comprise our apprentices and assistants throughout the trade at the present time approve, as Professor Attfield found most of the pharmaceutical students in the south with whom he conversed approved, of a compulsory course of scientific instruction such as the Council have adopted as the only way of entrance to pharmacy. With the hearty co-operation of the younger portion of the body, the educational difficulties which appear to beset pharmacy would be greatly modified, if not altogether removed.

Before closing, let me make a remark or two about the Evening Meetings. Happily under their influence the petty jealousies which prevailed before their institution are year by year disappearing, and a growing disposition is manifested by members for interchange of thoughts on pharmaceutical subjects. Of this we have had notable evidence in the papers read before this Branch of the Society in past years. One pleasing feature in connection with the discussions which have followed the reading of papers is, that they have often resulted in further investigations and more papers. The days have passed when men can live in a state of isolation in the prosecution of a common calling. There must be intercourse of men, and interchange of thought, and a spirit of common brotherhood—a desire to help one another. It is in this spirit that pharmacy can alone advance and keep pace with the other departments of medicine. It is this spirit that will furnish for our Evening Meetings profitable subjects for discussion, and temper criticism with a kindly moderation.

It has been grateful to observe the presence of this spirit in a marked degree in the remarks made by members upon the papers read at our Evening Meetings. If I would offer any observation now on this point, it would be that not unfrequently out of a modesty that is not wise, many who had opinions on the subjects under discussion have held back and refrained from speaking. This has arisen to some extent from the presence of those who from long usage had, from the foundation of the Branch, taken a conspicuous part in all its business being counted on to conduct the discussions. This—if not wise—was at least a high tribute to the worth of those to whom this duty and many more were intrusted. But the time has come when younger men must put their shoulder to the wheel, if the chariot of pharmacy is to make real progress and be in its place in the line of march with other branches of the arts and sciences which are to ameliorate the condition of mankind; especially if we desire to be helpful to that section which has set itself the task of preventing or mitigating human suffering.

Your Council desire that these Evening Meetings may prove highly instructive and agreeable to all, more especially to the younger members, so that if at a future time they come to be far removed from these rooms and this city, they may have cause to think gratefully of the evenings spent in this place. And, if they have begun to contribute pabulum for these meetings when on the spot, they may be encouraged to continue the good habit, and come up with, or send occasionally, notes on matters in pharmacy to be read and discussed. Such notes from brethren at a distance will, I am sure, be listened to with interest, and, in the discussions and results which follow, labourers will have their reward. They will thus feel that though separated from the centre they are yet present and potential.

In this I presume to express the mind of the Council; but, for the remarks I have made on the subject of education, I must be personally responsible.

Gentleman, suffer me to say a word for the Benevolent Fund, and then I have done. During the last year, as you are aware, a special effort has been made on behalf of our Benevolent Fund, which has been so

successful that the Council were able at last meeting to make arrangements for electing six additional annuitants, bringing up the number of them to forty-two, each of whom receives, as you know, £30 or £35. I am glad to say that Edinburgh was not behind in this matter. My predecessor, as you will recollect, made an eloquent appeal in its behalf in his opening remarks last year; and this was followed up by energetic action on the part of himself and Mr. Young, and the result was even beyond expectation. My principal object in referring to the subject is to impress on you that the interest then awakened to be of any practical avail must continue from year to year.

No one should withhold from subscribing because of the smallness of the amount it is convenient to give. A shilling or half-crown, from one, may be more than a guinea from another, when measured by the means of the givers. It is often the smallest things that accomplish most; the smallest things often repeated. And those who give a shilling when they can may be trusted to give more when convenient for them. Whether it be owing to Scotch thrift and independence, or to ignorance of the benefits at command, very few Scotch members have ever availed themselves of the Benevolent Fund. But, when a call has been made, it has always been freely responded to. Here as elsewhere "it is more blessed to give than to receive."

Mr. Young, in proposing a vote of thanks to the President for his address, remarked, that he was sure that the meeting had listened to it with much pleasure. Referring to the remarks on the Evening Meetings, he urged that the young men when qualified should identify themselves with the Branch, and give their fellow pharmacists the benefit of the experience which they had acquired in the course of their studies. He felt it unnecessary to comment in detail on the topics which the President had considered, but he might remark that a very able Committee was considering the whole question of compulsory pharmaceutical education, and this Committee, he had no doubt, would consider the opinions expressed in the provinces. In concluding, he emphasized the appeal for contributions to the Benevolent Fund, and hoped that all persons interested in pharmacy would contribute to it.

Mr. Stephenson supported the vote of thanks.

Mr. Dott then read a paper on "The Solubility of Morphia."

Dr. Inglis Clark said that the remarks which Mr. Dott had made on the solubility of morphia salts were very valuable. The whole question of solubility was wrapt in mystery, yet such observations as Mr. Dott's greatly favoured elucidation. He had drawn attention last session to the mechanical action of carbonic acid gas on the separation of caramel from a saccharine liquid; since that time he had observed that the pungent principle of ginger is thrown out of solution, or rather that it is brought to the surface of a tumbler of ginger ale, in the same circumstances. He remarked that Mr. Dott's experiments on the morphia salts were very valuable, and were a worthy contribution to the literature on the subject. The author deserved their thanks, and he had pleasure in moving that this should be accorded to him.

Messrs. Boa and McEwan supported the motion, and commented upon the introductory portion of the paper.

The Secretary to the Branch then announced the following donations:—

To the Library.

Year-Books of Pharmacy, for 1876 and 1879.
From the British Pharmaceutical Conference.

Six parts, *Journal of the Chemical Society.*

One part, *Journal of the Royal Society*, and

One part, *American Pharmaceutical Journal*, to complete volumes.
From the Pharmaceutical Society.

Twelve parts, *Journal of the Chemical Society.*
From Mr. G. D. Mackay, Edinburgh.

Eberle's 'Materia Medica,' vol. 2.
From Mr. Edwin Jones, London.

American Pharmaceutical Association, Proceedings, 1881. From the Association.

Smithsonian Institution, Report for 1880.

Smithsonian List of Foreign Correspondents.
From the Institution.

Massachusetts College of Pharmacy, Catalogue.

Philadelphia Alumni Association, Report.

Toronto School of Medicine, Report.

Victoria Pharmaceutical Society, Register for 1881.

Victoria Pharmaceutical Society, Pharmacy Act.
From the respective Publishing Committees.

Canadian Pharmaceutical Journal, January to October. From the Toronto College of Pharmacy.

To the Museum:—

Gadus morrhua, liver oil, specimens of British, Norwegian and Newfoundland products.

Gadus aeglefinus, liver oil, first and second extractions.
From Messrs. Carr and Sons, Berwick-on-Tweed.

Aspidium Filix-mas, large rhizome.
From Messrs. T. & H. Smith and Co., Edinburgh.

Thirty specimens of Indian Medicinal Plants from the collection of Dr. Trimen, Ceylon.
From the Pharmaceutical Society.

Herbarium Specimens of Indigenous Plants.
From Mr. Thomas Stephenson, Edinburgh.

Iodide of Bismuth, three samples.
From Mr. J. R. Hill, Edinburgh.

Sulphate of Magnesia.
From Mr. J. P. Coats, Leith.

Mr. MacEwan remarked that the herbarium specimens of Indian plants sent by Mr. Holmes were a valuable contribution to the Museum, and perhaps they were of more than usual interest from the fact that they were from the collection of Dr. Trimen, who was associated with Professor Bentley in the editing of 'Medicinal Plants.' The specimens with the fruit attached were very good, particularly *Canarium commune*, *Coffea Arabica*, *Coffea liberica* and *Toluifera Pereira.* Of the other specimens, six plants belonging to Zingiberaceæ were very interesting, and the specimens of *Cinchona succirubra*, *Croton Tiglium*, *Maranta arundinacea*, and a few others would prove very acceptable to many students. He hoped that more students would follow Mr. T. Stephenson's example in contributing their duplicate specimens of indigenous plants. The specimen of male fern rhizome was an exceptionally large one,—nearly 10 inches long and 8 inches in diameter. Attention was also drawn to the specimens of fish oils and the other contributions on the table.

Mr. Stephenson moved that the thanks of the Branch be accorded to the donors. This was agreed to with acclamation.

The meeting then adjourned.

Parliamentary and Law Proceedings.

Pharmaceutical Society of Great Britain *v.* James Kelsall.

This case was tried at the County Court at Stockport, on the 10th inst., before T. Hughes, Esq., Q.C., Judge.

Mr. Yates, instructed by Messrs. Flux, Son and Co., appeared for the plaintiffs, and Mr. Brown (Brown and Ainsworth) appeared for the defendant.

Mr. Yates said: May it please your honour, this is an action brought by the Pharmaceutical Society of Great Britain to recover from the defendant, James Kelsall, a penalty of £5 for an infringement of the Pharmacy Act passed in 1868. By a section of that Act it is enacted that from and after the 31st of December, 1868, any person who

shall take, use or exhibit the name or title of "chemist and druggist," or "chemist" or "druggist," not being a duly registered "pharmaceutical chemist" or "chemist and druggist," shall, for every such offence, be liable to a penalty of £5 to be recovered in the way prescribed by the Pharmacy Act. The circumstances of the case are these:—The defendant had a shop in Sandy Lane, Stockport, and over the door he had a notice "Kelsall, Analytical Chemist." He also had numerous handbills published, in which there was the heading "James Kelsall, Analytical Chemist." Of course it is of the highest importance that people who are not duly qualified should not be allowed to act as chemists, and exhibit over their door the title of chemist. A chemist, duly registered, is allowed to sell poisons and other dangerous drugs, and, therefore, it is of the very greatest importance that people in this line, especially those who deal largely with the working classes, shall be duly qualified to dispense these dangerous drugs. This gentleman, having the words I have given you over his shop, is written to by the Society, and his answer is certainly a somewhat curious one. The answer is filed as part of his defence to-day. He said that when he used and exhibited the title of "analytical chemist," he was not infringing the Act of Parliament.

Mr. Brown: No.

Mr. Yates: I say that the defendant said "that when he used the words 'analytical chemist' that it was not his intention to act contrary to the provisions of the Pharmacy Act." The question is, did he use or exhibit the name? The Act says nothing at all about the intention—not a single word. In his letter which he writes in reply to the one received from the Registrar of the Pharmaceutical Society, the defendant sets up another extraordinary contention. He says, practically:—I know the Act well. I have not used any of the terms which are forbidden by the Act, because I have put before the word "chemist" the word "analytical." That is an extraordinary defence indeed.

Mr. Brown: I dispute your rendering of the defence to be set up.

Mr. Yates: It is plain from his letter, which distinctly implies this:—The title I do assume and use is that of "analytical chemist." And this he contends is not within the meaning of the Act. The whole question for your honour is, did he use the word "chemist." If the defendant had called himself an "analytical person" we should have said nothing at all to him, but having used the words "analytical chemist," he therefore infringed the Act, he made use of a title he was forbidden to use, and therefore incurred the penalty. The facts of the case are very short and simple.

Mr. Brown: I will admit the facts.

Subsequently it was decided to hear the evidence.

Thomas William Stroud, managing clerk to Messrs. Flux, Son and Co, 3, East India Avenue, London, E.C., was examined by Mr. Yates.

On the 14th of October last did you go to the shop of the defendant in Stockport?—Yes, I did.

Did you see exhibited over the doorway his name and title of business?—Yes.

Where was it particularly?—On the fanlight, a glass fanlight.

What was it?—"Kelsall, Analytical Chemist."

You say it was on the fanlight?—Yes.

Did you go into the shop?—Yes, I went into the shop and bought some glycerine.

Did you see anything on the counter, any bills, handbills of any sort?—Yes, I saw some bills, one of which I have got (handed to the Bench).

Do you know the person who sold you the glycerine, —did you speak to him?—Yes.

Did you ask him if he was Mr. Kelsall?—Yes.

And what did he say?—He said he was Mr. Kelsall, and in the course of our conversation he told me that he was an analytical chemist.

And you took the bill, which has been produced, from the counter?—Yes.

I believe there is the same notice to-day of the name and business on the fanlight?—Yes.

In fact, I believe you have been this morning?—Yes.

I believe that the Secretary of the Pharmaceutical Society is Mr. Elias Bremridge. I mean the Registrar to the Society?—Yes.

In August last he wrote to the defendant.

Mr. Brown: I object to the answer.

Mr. Yates: Do you produce as per notice?

Mr. Brown: I produce nothing.

His Honour: Then you can prove in the ordinary way.

Mr. Yates: The defendant was written to in August last by Mr. Bremridge, and in reply, on the 15th of August, the defendant wrote back:—"I have the honour to acknowledge the receipt of your communication of the 12th inst., wherein you state that representations have been made to you, as the Registrar of the Pharmaceutical Society of Great Britain, that I am acting in contravention of the provisions of the Pharmacy Act of 1868, by the use of the title 'chemist,' and calling on me to offer an explanation as to the representations which have been made to you. In reply I have to state that you have been wrongly informed. I have not assumed or used the title 'chemist,' or 'chemist and druggist,' or 'druggist or 'pharmacist,' or 'dispensing chemist or druggist,' or 'pharmaceutical chemist' within the meaning of the said Act. The title I do assume and use is that of 'analytical chemist,' a profession I have practised for sixteen years, and which I am advised is without the jurisdiction of the Pharmaceutical Society." In reply to that, Mr. Bremridge wrote:—"Referring to your communication, I have to inform you that the use of the title 'chemist' in any form whatever by you is illegal, and I must request that the infringement be at once discontinued." By this letter of the defendant's he forced an issue, and when he asked if the explanation was satisfactory, he was told that it was not. (To witness.) Do you know Mr. Bremridge?—Yes.

He is acting every day as the Registrar of this Society?—Yes.

Was he present at his office yesterday?—I saw him yesterday at the office of the Society.

Do you produce the Register of Pharmaceutical Chemists?—Yes.

Just look and see if the name of the defendant appears?—It does not.

And that Register by the provisions of the Act is evidence?—Yes, it is.

Mr. Yates: I have no other questions to ask.

By Mr. Brown: You say that you noticed the words "analytical chemist?"—Yes.

Did you see the word "laboratory?"—No.

I mean when you went the first time?—No. Nor did I see it this morning.

Mr. Brown: I understand it is there.

The Defendant: It is.

Witness: I did not see it.

And you have come down from London to prove what you saw at his shop?—Yes, and what I got by the handbill.

Exactly. In the Register now produced there is no register of analytical chemists?—No, not as such.

Just look if you can find the name of Mr. Oswald Wilkinson, analytical chemist—analyst for the borough of Stockport?—There is no such thing.

I want you to look though. Is there a person of the name of Oswald Wilkinson. Is he registered?—Not as a chemist and druggist.

In any way whatever?—No, sir.

Next, look if you can find the name of Mr. Carter Bell, the analyst for the County of Chester.—I cannot.

You cannot. Then look if you can find the name of Dr. Bourgart, analytical chemist, Manchester.

Mr. Yates: You are assuming that he is an analytical chemist.

Witness: I dare say that he will be on the Medical Register.

Mr. Brown: Never mind. Is he there, I ask you?

Witness: I do not think that he is.

Is there the name of Mr. Estcourt, or Estcourt and Co., Analysts for the City of Manchester?

Witness: No.

His Honour: Is it worth while going further into this point, Mr. Brown? You have got several examples.

Mr. Brown: Yes, it is. Here is 'Slater's Directory.' I will just ask the witness to look at this work. (Book handed to witness.)

Is there a heading, "Analytical Chemists?"—Yes, there is.

Under that heading is there Estcourt and Co.?—Yes.

Under that heading is there Oswald Wilkinson?—Yes.

Is there Carter Bell?—Yes.

And in point of fact all these gentlemen are under the heading of "Analytical Chemists?"—Yes.

And yet they are not registered?—Yes, but is that Directory their own act?

Mr. Yates: That is just the point.

His Honour: What is that?

Mr. Yates: The witness say, Is what is in that Directory "their own act?" It is Mr. Slater who calls them analytical chemists, and we have nothing whatever to do with what Mr. Salter calls them.

Mr. Brown having addressed the court for the defendant—

His Honour said: This, I must say, is a very unfortunate case for the defendant, and to the public it is a very important case. The defendant appears to be a person who has served his country in foreign parts and to have been wounded there, and everyone must feel the greatest sympathy for him. From his experience in South Africa it is said that he is considerably skilled in the healing of wounds, and it is also said that he is a competent analyst. Of course I am not prepared to say that he is not thoroughly competent, from his experience in South Africa, both to deal with wounds, etc., such as those he states in his prospectus, and also to sell drugs.

Mr. Brown: He does not sell drugs.

His Honour: You see that I have this bill before me. One of the contentions is that he is not a pharmaceutical chemist. I have here before me his own bill, which says that "James Kelsall, Analytical Chemist, late Surgeon's Assistant, Government Hospital, South Africa, cures burns, scalds, ulcers, bruises, etc., etc., at the little hospital in Sandy Lane." In fact he names nearly all the ills to which flesh is subject, and, therefore, there must be dressings and medicines.

Mr. Brown: He uses patent medicines, for which he has a licence.

His Honour: Now the case on behalf of the defendant has been opened as a very hard one for him, and certainly in one sense it was very hard that everyone should not be able to exercise every faculty they may possess for their own good; but for the protection of society the British Legislature has enacted that which has for its object the protection of the British public from those practitioners in the country who are not fully competent. Now, if the defendant is fully competent he has only to go through the ordinary course of obtaining power to deal as he wishes to deal with these drugs and other medicines. But now comes the question which really has to be settled, and which I must decide. The merits of the case I have thoroughly followed. I wish to state that I have respect for a man who has personally suffered in the service of his country, but then comes the legal question to be decided. This person puts himself forward as an "analytical chemist." He knows thoroughly well what he is about, for as early as August he was reminded by the Pharmaceutical Society that he had no right to the employment of the term "chemist." And what did he say in reply? He said that he did not use it in any sense which would bring him within the meaning of the Legislature in passing the Pharmacy Acts, and his argument has been an argument which has been well put before the court by Mr. Brown. He does not say that he is a chemist at all, because he says he is an "analytical chemist." It seems to me that, having regard to the meaning of the word "chemist," one might as well contend with regard to a man that he was not a man because he is a warm-blooded man. I think that is a contention which cannot be sustained at all. And what is the consequence? Mr. Brown, in his speech, has called attention to the fact that the Act should be strictly construed. I think that in the case of any such person as this, who uses or exhibits the name or title of chemist and druggist, or chemist or druggist, not being a duly registered pharmaceutical chemist or chemist and druggist,—it seems to me that it is impossible on the strictest construction of the terms of the section,—it is impossible to say that a person who publishes himself as an analytical chemist does not come within the meaning of the Act. I think that in this case the defendant has distinctly and clearly infringed the terms of the Act. The case seems precisely to be one of those which the Act is intended to meet, and to be applied to. Defendant has incurred the penalty, and judgment must be for the plaintiffs.

Judgment for the plaintiffs for £5 penalty, and £5 12s. costs.

Liebig's Extract of Meat Company, Limited, v. Anderson.

Judgment.

Mr. Justice Field: The action is brought to restrain the advertisement and sale by the defendant of an article known as "Liebig's Extract of Meat" under the designation and in a manner which the plaintiffs allege to be an invasion of their exclusive rights. The facts, not substantially in dispute, are these:—The plaintiff company was established in 1865 for carrying on, and have since carried on the business of manufacturing and selling Liebig's Extract of Meat, an article of medicine and food which has been extensively made and sold under that designation ever since the year 1856. Originally discovered by Proust, the French chemist, and published by him in 1801, the method of preparing it suggested by him was rendered practicable by the late Baron Justus von Liebig, and fully explained by him in 'The Annals of Chemistry and Pharmacy, 1847,' and again in 1851 in his well-known 'Familiar Letters on Chemistry,' published in London. Up to this time used principally as a medicine, the extract soon became an article of food in general demand; and at this period, at all events, Baron Liebig's express wish with regard to the discovery was that the benefit of it should be in no way reserved or made the source of pecuniary advantage to himself, but should be placed at the command of as large a number of persons as possible by the extension of the manufacture, and consequently, a reduction in the cost. The views which he expressed at this time are best to be found in an article published by him in 'The Annals of Chemistry' in 1865, in which he details the steps taken by him to effect these objects, and his intention that a connection which he had, in 1863, formed with a commercial adventure, undertaken by a company known as the Société de Fray Bentos, should not interfere with them. The material parts of this article (it is not necessary that I should read the whole of it) are these:—"Since my examination of the nature of meat, made in the year 1847 ('Annals of Chemistry and Pharmacy,' vol. lxii.), I have constantly endeavoured to promote, in countries where beef is much cheaper than with us, the manufacture of extract of meat according to the method then described." Then he compares the extract with soup tablets and other extracts, and then he says:—"To give an idea of the extensive use of the extract

as a medicine, it will, perhaps, suffice to state that in the Royal Pharmacy of Munich nearly 5000 lbs. of beef are employed yearly for its preparation." Then he goes on to show how extensively it is used. Then he says:—"The introduction of extract of meat at half or a third of the price now paid in Europe, from countries where meat has but a nominal value, would be regarded as a real blessing to the people of this quarter of the globe. In Podolia, Buenos Ayres and Australia, I earnestly drew attention to the manufacture of extract of meat, and was always ready to explain the method of preparation to such persons as were desirous of being acquainted with it, and assist them with my advice. I introduced Mr. Giebert to my friend, Dr. Pettenkofer, who willingly admitted him to the Royal Pharmacy, and made him acquainted with the minutest details of the process of preparation." And then he goes on to say that he received samples from Mr. Giebert of his first results of his manufacture of extract of meat. Now comes a very important part of the circular, because it is one of the things on which the plaintiff company rely for a portion of the reputation which they say their extract of meat has obtained amongst the public. He says, "Mr. Giebert expressed a desire that the extract should be designated by my name, *Extractum carnis Liebig*, as it was prepared according to the method prescribed by myself. I agreed to his request." Then he says, "on the other hand, we promised him (Dr. Pettenkofer and myself) that if he would send the entire produce of his extract to Munich we should be willing, without any compensation whatever, to submit each of his consignments to an analysis, and, in the event of its possessing the qualities required by science, to guarantee its genuineness on the condition that the retail price of the extract of meat per pound should not exceed one-third of the present price in Europe. We would not lend our names to support a pecuniary speculation. This arrangement was of course to continue only during the first period of the introduction of the extract into Europe, as it is assumed that when the public is once acquainted with the trade mark of the genuine extract of meat they will no longer need the chemist's guarantee to form their own judgment of its excellence." Now there can be no doubt upon that, that the Baron there does expressly state his view and desire to be that this extract should become an article of common use, and to take away from it all species of monopoly, because he wishes to have it reduced to at least one-third of its then price; and at the same time in the interest of science he says, "I have come to an arrangement with the company by which I will guarantee a quality such as they produce and thereby be assured that the product which they send into the market is one which has been properly prepared according to my method." But the account which he gives of his arrangement with Mr. Giebert is not quite so full as it might have been, for he did not disclose that by the arrangement of 1863 made with the Fray Bentos Company, he and Dr. Pettenkofer were to receive for a period of five years, the pecuniary compensation of 2 per cent. on the annual profits of the manufacture and, which is the important part, that Dr. Pettenkofer and the Baron in return for that 2 per cent. engaged to analyse and certify their approval of the extract produced by the company. Now up to this year of 1865 the bulk, if not the whole of the extract sold in the London market, was the produce of the Fray Bentos Company. There had been, I think, certain persons who, in certain parts of England had manufactured this extract, but it had reached to no great extent up to this year, 1865. Between 1861 and 1865 the value of the extract, as an article of commerce, had become by that time generally known and in that year, or the following year, 1866, various manufacturing chemists in England and elsewhere had commenced or were intending to commence to manufacture, and some of them, including Mr. Giebert, were desirous of securing the advantage of putting their products into the market with a guarantee of quality by Baron Liebig, the inventor of the discovery. The extract thus manufactured was sold in England by some of the manufacturers as "Liebig's Extract," and by other manufacturers as "Baron Liebig's Extract of Meat." Amongst others, a Mr. Robert Tooth, of Sydney, proposed to make use of the waste meat of Australia in the same way as the Fray Bentos Company did of that of Uruguay, and he entered into negotiations with the Baron for the purpose of obtaining his co-operation by his analysis and guarantee in return for a pecuniary compensation to the Baron; and thereupon a correspondence ensued, which was very much relied upon at the trial, and very properly so, and therefore I shall refer to the material parts of that correspondence. On the 16th of September, 1865, there is a letter from Justus von Liebig to Mr. Robert Tooth. Just before that time Mr. Tooth had sent to him his proposal for an arrangement with the Baron for the purpose of securing an analysis, and this is the answer of the Baron to that application:—"Dear Sir, —In acknowledging the receipt of your letter of this day's date, I wish to express my concurrence in the points of the agreement proposed therein, which, however, on my part can only be executed after having arrived at a satisfactory arrangement with Messrs. Giebert and Co. at Antwerp. The process is, however, no secret, and so simple, and you seem to understand it so well, that for the present a more detailed instruction is hardly necessary." On the 23rd of September comes another letter in which he repeats an objection to evaporation, which is not material for the present purpose to discuss. Then he says this:—"I should always prefer your mode of evaporating. The Government in consequence of my recommendation uses already the extract of meat in several hospitals, but you do not want Government, there is no fear of selling every quantity brought to market. I transmit a copy of your letter of the 16th, and in a few days I shall communicate to you some additional articles to be inserted into the document of agreement for your consideration and approval?" It therefore seems that at that time, although the Baron was under the arrangement come to in 1863 with the Fray Bentos Company, he still entertained the proposal of Mr. Tooth for the purpose of seeing whether he could come to some agreement with him, but, as the next letter will show, he did not carry that out by reason of what was occurring at that time. What was happening at that time was this, that the Société de Fray Bentos were utterly unable, with the capital at their command, to meet the demand for extract of meat, which had become so great and universal, and they were at that time preparing to enlarge their operations, as they ultimately did, and form what was called the Anglo-Belgian Company, consisting of Mr. Giebert, who was an Antwerp engineer, and certain English gentlemen, the seat of which was to be in London, for the purpose of extending and promoting the manufacture. During this time, while the correspondence was going on between the Baron and Mr. Tooth, the Baron was already receiving proposals from them by which his name was to appear as the Scientific Director, and it did so appear in the preliminary prospectus of the New Anglo-Belgian Company. This is a letter dated 6th October, from Munich:—"Soon after your departure I have taken all possible steps to free myself from the obligations under which I am towards Messrs. Giebert and Co., but there is no chance to arrive at a satisfactory result with respect to this previous to the 16th of this month. For this reason a personal interview could not possibly lead to any result. I am still most willing to help and assist you in your undertaking, because it would not only be a benefit for the colony but also for the world." Nothing can be more clear or conclusive to show that the Baron wished to extend the advantage of his preparation all over the world and to get it made at as low a cost as possible. "Allow me to tell you that you need not trouble yourself with finding

out a new method or a simpler one for the preparation of the Extract of Meat, all this has been done a hundred times; there is only one method for manufactory and this is to mix the chopped flesh with its volume of soft water (without gypsum) and to raise the temperature of that mixture at the temperature of 180° F. To extract the essence with cold water is not applicable for manufacturing." Then he describes what it is. Then he says, "I am told that one of the best houses in London for the sale of the Extract is Allen and Hanbury, another is William Hooper, of Pall Mall. I request you to have the kindness to name me an agent, with full power to act, residing at London, with whom I may further confer on this matter." He, therefore, still continued to hold out, as I said before, a sort of prospect to Mr. Tooth, that he would soon be able to give him the benefit of his analysis. In November appeared the preliminary prospectus of the Anglo-Belgian Company, and, of course, as soon as it appeared that Baron Liebig was the Scientific Director of the Company, his negotiations with Mr. Tooth came to an end. At the same time he also corresponded with Mr. Hooper, a chemist of distinction. I think that only one letter of that correspondence is important, and that is, I think, the letter of October 6. He says:—"Your manufacture is perfect; there is nothing equal in Germany. I have written Messrs. Giebert and Company about the extract of meat, but the demand is so great and the supply so small in proportion that they seem to be unable to send you more, as they did. They are increasing their manufacture and in a few months there will no lack of *ex. carnis.* Mr. Steven Squire has sent me his letter, printed in the *Lancet*, about my food for infants in its improved form. Messrs. Savory and Moore and Hassall have "caught it," and I think that the *extractum carnis* and my food for infants are now better known in England, I should even say, than in Germany." Then another letter comes, which is very important indeed, in which he says this:—"It is very unfortunate that the supply of *extractum carnis* is so small in proportion to the demand, being only 3000 to 4000 pounds per month, presently not sufficient for the town of Berlin alone, but no person in the world could foresee that the article would so soon be appreciated by the public. This great success has led to the transformation of the Fray Bentos Company into a new Anglo-Belgian Company, Limited, with an enlarged capital, and in six or eight months two new establishments will be formed, which, joined to the manufacture at Fray Bentos, are able to produce 30,000 to 40,000 pounds per day. I am not a rich man but I have taken myself one hundred shares. I have undertaken the direction of the scientific part and shall give to the public, by severe chemical control, a guarantee of the genuineness of the article. If you establish a similar manufactory you may be certain to succeed. The produce of the new company, with all its enlargements, will prove insufficient for the wants of the world." Then there is another letter of the same gentleman, later on, in which he says that everything concerning it is in the thirty-second of the 'Letters on Chemistry,' which is one of the letters published in the 'Familiar Letters,' and that the Anglo-Belgian Company has patent rights in Uruguay, Buenos Ayres and the United States, but not in England. That is the correspondence, as far as material, with Mr. Hooper. That as I have said before speaks for itself, showing that the Baron had not the remotest idea that anything he had done, or was about to do, would interfere with the sale, or create a monopoly in England, at all events, whatever may be the state of things elsewhere. Now, at that time, as I said before, he had consented to become a director of the New Anglo-Belgian Company. It was established in 1865. What is now the 137th, but what was formerly the 141st Article of Association, is very important indeed, because it forms the starting point of the plaintiff Company's argument upon which their case rests, and a very strong starting point it is, there is no doubt about that. Now, the article is in these terms:—"Baron Liebig shall be the first and present Director of the Scientific Department, and for Control of Analysis.' It will be observed that he is here spoken of by his title. He was a Professor at Giessen at that time, and a man of great eminence, and was induced to remove to the Capital of Munich when the King of Bavaria made him a Baron. In this article he is described by his title "Baron Liebig." It says "Baron Liebig shall be the first and present director of the Scientific Department, and for Control of Analysis. The analysis of all extract of meat arriving at the Company's general dépôt at Antwerp shall be under the immediate control of Baron Liebig, and such chemist as may be appointed by him as his delegate." Then the directors are to pay him 2 per cent. on the net annual profits of the Company. That was the arrangement which was come to under that Article. But again, in that Article of Association there is no monopoly of any sort or kind, and no attempt at creating it. It is simply this, you, the inventor, may be of service in analysing the article, and telling the public that the article is a good one, and in return for that we will give you 2 per cent. upon our profits. Services are rendered and there is a reward for those services. Now in the latter end of 1865 or the first six months of 1866, Tooth had brought or was bringing practically into operation his arrangement for manufacturing in Australia, and bringing the extract to the London market. He had in 1865 entered into an agreement with Messrs. Allen and Hanbury, gentlemen who are referred to by the Baron in his letter as being the first chemists in England, for a consignment to them of the article manufactured by Tooth in Australia. It is important to observe that at the time of that agreement in November, 1865, Messrs. Allen and Hanbury, who had dealt considerably before that time in Extract of Meat with the Fray Bentos Company by taking it from Antwerp and consigning to them there, entertained the hope that they would be able to secure the Baron's analysis for themselves, because in the agreement between Tooth and Allen and Hanbury they inserted this proviso that they should not be compellable to sell any extract in Australia unless with the approval, or under the analysis of Justus von Liebig, or, if he declined, some other chemist who might be agreed upon between the parties. In this state of things it appears on the whole to have been thought advisable by those who were interested in the success of the new company, called Liebig's Extract of Meat Company, to tighten the bonds of connection between it and the Baron, and to create if possible an exclusive right to his name and manufacture in them. That was very natural, because there was a competition springing up all round. There was the competition of Harvey and Reynolds, Savory and Moore, Allen and Hanbury and Tooth. This was too valuable an article for anybody who chose to be allowed to deal in, and evidently the Company began to feel the competition and wished to secure the Baron from lending his aid to anybody else, and to secure if possible a monoply for themselves Accordingly, in the month of April, 1866, two documents were signed which are of the greatest possible importance in the present case, and which are greatly relied upon by the plaintiff Company. One is a power of attorney by which the Baron professes to grant "the sole and exclusive right, power and privilege to use the name '*Extractum carnis Liebig*,' or to use my name in any other manner which the said company may from time to time see fit, in naming or indicating the *Extractum carnis*, manufactured according to my method or with any improvements therein." Then it gave them power to take out patents for various other manufactures of the same kind. But a more important instrument was the agreement, signed on the same day, between the Baron and the Company. The agreement of 1863 was for the limited period of five years, and that was one between Dr. Pettenkofer on the one hand, and the Company on the other. Dr. Pettenkofer is not made a party to this second agree-

ment at all. He is an eminent chemist, but I do not know that he succeeded in reaching the reputation that Baron Liebig did. Baron Liebig's name, as we are aware, was a household word; Dr. Pettenkofer was a chemist of great repute in Munich, but still not having that reputation which Baron Liebig had, and therefore, Dr. Pettenkofer, although he was made to play a subsidiary part under this agreement, was not made a direct party to it, nor was the agreement made directly with him as it was in 1863. This is the agreement: It recites the Articles of Association, and then it comes to this, that Baron Liebig grants the full use and benefit of the invention in South America and in any other part of the world. It confirms the power of attorney, and says that for ten years from 1866 "the analysis of all extracts of meat arriving at the Company's general depôt shall be under the immediate control of him, the said Baron Justus von Liebig and his delegate, Dr. Max Pettenkofer." Then it provides that he will keep secret or not disclose the invention. Then there is a clause for the exclusive use of the name of the manufacture so far as the Baron could grant it at that time. I think there is not the smallest doubt that he did grant it. It is to be observed that Dr. Pettenkofer becomes what is called the delegate, which really amounts to this, that when a sample of extract of meat came from America, as Baron Liebig could not analyse it personally he, therefore, appointed Dr. Pettenkofer to do so. If samples go to London they are to be examined by one or the other, as the case may be, and they both certify their approval in the manner which appears on the plaintiffs' labels. Then the course was that of every parcel of extract consigned to the depôt at Antwerp a sample was sent direct from South America to Munich where it was analysed by either Baron Liebig or Dr. Pettenkofer. After they had analysed it they certified to the effect that it contained so much ash, so much water, and so on. Now the Company of course carried on a wholesale business. They dealt with Allen and Hanbury, and Savory and Moore, and everybody who liked to deal with them. They also had an agency in London for the purpose of the sale of their article. They were in the habit of supplying large customers like Allen and Hanbury, in bulk to be sub-divided by them, and again grocers and other people they supplied with small pots for the purpose of selling them retail. Messrs. Allen and Hanbury in 1865 began receiving extract from Mr. Tooth and the description of what they did then is to be found in paragraph 20 of the Bill:—"The plaintiff Company a short time since for the first time ascertained that the defendants have recently commenced selling under the name of "Liebig's Extract of Meat," and in pots closely resembling in size and material and general appearance those used by the plaintiff Company as aforesaid, an extract of meat prepared by a person named Robert Tooth, of Sydney, in Australia. Such pots have burnt in on one side the following words and figures:—"Liebig's Extract of Meat. Allen and Hanburys. Trade (an ox and a plough) Mark, A.D., 1715, London." And on the opposite side is pasted a printed paper describing the mode of manufacture, preparation, and so on. I need not go through all this. There was a paper label which was headed "Liebig's Extract of Meat," and an advertisement also to the same effect. Now the plaintiff Company complained of that; they said as soon as they saw these advertisements (I have got them all here, but it is not worth while going through them) the vice in them, for there was a vice in them, as far as the Company's view of the case was concerned, was that they were calling this thing "Liebig's Extract of Meat." Accordingly in 1866 they filed a Bill against Messrs. Allen and Hanbury for the purpose of restraining the use by them of the words "Liebig's Extract of Meat," or any other title of which the word "Liebig" forms a part. The case came on for hearing before the late Lord Hatherley, then Vice-Chancellor Wood, and his judgment was a direct decision, I will not say conclusive. The evidence before him was very much the same as the evidence before me. The Vice-Chancellor did not call upon the counsel of the defendants, but gave judgment in this way. He says, "I think it is impossible in this case to grant to the plaintiffs an injunction to restrain the sale of the article upon the ground of the use of the term Liebig's Extract of Meat. Then he says, "As to the use of the name,"—which is the great point—"it all turns upon the proposition (which is a simple proposition of fact) whether or not this article which the defendants sell had acquired the name of Liebig's Extract of Meat at the time they adopted the name for the purpose of using it, and irrespective of its being also a common name which was used by the plaintiffs. In other words, whether the only thing then existing in commerce was some article manufactured by the plaintiffs, or by those through whom they claimed a title." Then he says: "The plaintiffs claimed a right to use the name, so that the extract made by them could be thereby distinguished from anything made by the rest of the world." That to my mind is almost the governing proposition in the present case. The claim is the same here. The plaintiffs claimed a right to use the name so that the extract made by them could be "thereby distinguished from anything else made by all the rest of the world, and so as to exclude the rest of the world from taking a title exclusively adopted by the plaintiffs. It appears to me, that the case wholly fails on that ground. It seems to me upon the evidence that the title of the Liebig's Extract of Meat was a title acquired before the firm of Fray Bentos had distinctly acquired any interest whatever, that being in the year 1862." Then he says:—"Looking at the whole of this evidence it amounts to nothing more than this, that having a great reputation he did not wish to see his name bandied about and applied to other articles in the same manner as Dr. Clark's and Dr. Locock's well-known names have been attached to pills and wafers, the composition of other persons. His name was used from 1860 to the end of 1864, according to the statement of Dr. Pettenkofer. The extract being largely used at Munich was quite sufficient to give it a name. The name was not used in any way as a sort of right of property, which the Baron wished to reserve. Nothing of that kind appears, but simply that he did not wish his name to be attached to an improper article. In that way the name became generally known; it was known all over Germany; it was known to some people in this country; but it might not have been known to all, and that might account for the discrepancy (if it may be so called, for there really is none) between the two classes of witnesses." The Vice-Chancellor says that it is a question of fact. His finding on a question of fact does not bind me, nor am I am bound to follow him, but I am bound to say on the evidence before me, which is exactly the same as the evidence before him, that I come to the same conclusion on the question of fact that he did, namely, that up to 1866, when the Baron and the present plaintiff Company entered into that arrangement that the power of the Baron to create what he then did, was gone; it had become before that time in the words of the Vice-Chancellor "common property." Liebig's Extract of Meat had become a commercial article, known under that name, and that ceased to be the distinctive mark, if ever it was, of the manufacture of Liebig. Then he goes on to comment upon the evidence, and says, "I cannot be asked to interfere unless these gentlemen make out that from the character of their business this article would be supposed to be made and sold by them as being exclusively their article:—'The object of this Company is to manufacture on a large scale, not an article of commerce to be called Liebig's Extract, but to manufacture on a large scale the pure and genuine *Extractum carnis Liebig.*'" That is to say, "There is the

article, but like everything else it is adulterated. There is a well-known article in commerce known as *Extractum carnis Liebig*, and we are going to give you the genuine article." What follows is relied upon as of great importance by the plaintiffs, and so it is; it is this, with the assistance and under the immediate control of Baron Liebig, and this is the real advantage the plaintiffs possess. They have the Baron's assistance, and they have his fiat to what they issue forth to the world, and no doubt it is a considerable advantage as far as they are concerned. This authority was not at all disputed. Although they gave notice of appeal to the House of Lords, they did not follow that up. That case had been acted upon and is distinctly approved of if, it were necessary, by the present Master of the Rolls in the case of Thorley *v.* Massam. But since that the Company made various alterations, and they altered the designation of their article. Up to that time they called it "Liebig's Extract of Meat." This decision had established that that was common property. A man has a right, as far as I can understand, to carry on his business, so long as he does not interfere with the rights of anybody else. That case established that "Liebig" was common property. There is no suggestion that the article manufactured by Anderson is an inferior article which would not pass in the market on its own merits, but only on the back of the Company's reputation through an imitation of their mark. Therefore, they altered their title. It is very important to see what they did not do and what they did do. They, therefore, first of all made a trade mark. It is very important to see what their trade mark was. It was this "Extractum Carnis Liebig;" they altered that title to "Liebig Company's Extract of Meat;" they did not take the word "Baron" although the word "Baron" was a word known in the market before. This alteration continued until the death of Justus von Liebig in 1873. Dr. Pettenkofer took the Baron's place, and Hermann von Liebig, who is one of the plaintiffs in the present action, took Dr. Pettenkofer's place, and from that time down to the present time the process of analysing has been gone through in the same way, except that the analysis is signed by Dr. Pettenkofer and Hermann von Liebig instead of being signed by Justus von Liebig and Dr. Pettenkofer. The *facsimile* autograph of the Baron was still continued, and has been continued up to the present time upon the labels of the company. In 1881 a company known as the Australian Meat Company, otherwise called the Ramornie Company, who manufactured in Australia in competition with Mr. Tooth, and everybody else, were what is called wound up. Mr. Anderson, the present defendant, had been their secretary. Of course it is obvious that as their secretary, if he attended to his duties properly, which I dare say he did, he would become acquainted with their trade and would know what the character of the article was, and of course a great many of the business connections with it. Under those circumstances he appeared to have made up his mind, which he had a right to do, to undertake the business of selling Liebig's Extract of Meat. The course he adopted was this: there are numerous manufacturers, indeed every place in South America makes extract of meat, and he imported it to London in bulk, and then subdivided that into pots, and sold it in retail either by himself or by means of other houses. By that means Anderson was getting his business in order and disposing of his extract of meat. Now the plaintiff Company complained again of that. They said, "This will not do, you cannot go on doing this." It is perfectly true, they said, "You have a right to call your article Liebig's Extract of Meat if you will; you have a perfect right to use the word 'Liebig,' but you have no right to use the words 'Baron Liebig;' that is wrong. "You may call it 'Liebig," but you must not call it 'Baron Liebig.' Moreover it appears that Mr. Anderson got hold in some way or other of a photograph of the Baron, but I am bound to say that I do not think there is any ground for suggesting that he got hold of it dishonestly. We are perfectly well aware of the effect of pictures, we know how much everything is sold by pictorial illustrations and photographs. Although I must not bring my own evidence into the case, I am perfectly well aware that when I walk along the street, I see everybody photographed. It occurred to Mr. Anderson that if he could put a photo of Baron Liebig on his pots, that that would be an attractive mode of selling the articles, and he was right in his conjecture, for it turned out very attractive indeed. But that is the head and front of his offending. The plaintiff Company complained of the use of the word "Baron" and of the use of this picture, and wrote letters, and the present Bill was filed. Now, having reached this stage it is necessary to describe what it was the defendant did. I have said before he did not call his extract merely as he might have done "Liebig's Extract," but he used the word "Baron," and that word was a word that had been used before in 1865 and 1866, and certainly I rather think at an earlier period by Savory and Moore, and I rather think by Harvey and Reynolds, but it does not matter who used it, because the fact was it had been known before as "Baron Liebig's Extract." The plaintiff Company, it will be observed, had never used the word "Baron," and they had never used a picture of any sort or kind, therefore it cannot be said that this had been any imitation of their use of the word "Baron." Then it was said, although there was no imitation of that kind, yet the word "Baron" and the picture were calculated to mislead. "The object and intention of the defendant in calling his extract by the names and designations aforesaid, and in using the pots aforesaid, and in affixing thereto a likeness whether photographic, lithographic, or otherwise, purporting to be a likeness of Baron Liebig, and the words 'Brand Baron Liebig,' was and is to get (as the defendant has in fact thereby got) the benefit of the reputation in which the plaintiff Company's extract is held, and to mislead (as the defendant has in fact thereby misled) purchasers into the belief that in buying the defendant's extract of meat they were in fact buying the extract of meat manufactured by the plaintiff Company." That being the state of matters the charge against the defendant is twofold. First, it is alleged that the defendant had in fact got the benefit of the reputation to which the plaintiffs' extract is alleged to be entitled, and has in fact misled the public into the belief that in buying that extract they are buying the article which is the plaintiffs' well-known manufacture. Then it is also alleged that in doing that he did it intentionally, with the object of getting that benefit and so misleading the public. Now if the plaintiffs were to be confined to the exact terms of their allegation, the question would have been more limited than it really now is, and that would have been whether the extract sold by the defendant was sold under such a title, because there was but little evidence of any misleading in point of fact. The real question argued before me, which I propose to decide, is whether the extract sold by the defendant is sold under such titles, designations and brands as to be reasonably calculated to deceive and mislead, not the trade, because the trade would not be misled at all, but the ultimate purchasers, the public, into the belief that they were buying the extract of Baron Liebig. As I said before, of actual misleading in point of fact there is very little evidence. That evidence, I think, fails, even if it is to be believed. The question is not what a fraudulent retailer may, by successful manœuvres in his shop, succeed in inducing people to take, but whether, under ordinary circumstances, reasonable people who have got eyes in their heads and who really use them and make use of them fairly and reasonably would be misled. If what the defendant does is so calculated to mislead, of course the plaintiffs would be entitled, at all events, to an injunction, because if it was done originally fraudulently

and with an intention to deceive, there is no doubt that action for deceit would lie. Whether or not it is necessary in an action for deceit that fraud should exist, and whether or not it is necessary that there should be held to be a right of property in a mark other than a trade mark, about which the Court has expressed some considerable doubt in the recent case of the Singer Manufacturing Company *v.* Wilson, it is not necessary here to say, because there is no doubt whatever that if a man honestly believes that he is only exercising his *bonâ fide* rights and makes use of any portion of the mark of another, or in any way suggests by reason of any brand or designation of his own that his article is the article of another, there is no doubt whatever, and everybody agrees in this, that as soon as he ascertains and knows that what he has done, innocently perhaps, or ignorantly, possibly, is in violation of the rights of another that imposes a liability upon him of discontinuing the wrong. If in the present case it can be established that the defendant's marks and brand are calculated to deceive the public the plaintiffs would be entitled to the injunction which they ask. I think it is hardly necessary to quote authorities for that, but I will name the two cases which I have taken for that proposition, namely, Wotherspoon *v.* Currie, and the Singer Manufacturing Company *v.* Wilson. That being the law which I want to apply I have to consider whether the facts bring this case within the principle so laid down. In support of their case the plaintiffs called a large number of respectable and very well qualified witnesses in the trade who established to my satisfaction that the plaintiff Company's extract has had and still has a considerable reputation in the market, and that that reputation is due, not only to the fact that Liebig's name is connected with it,—although that, according to the decision in Liebig's Extract of Meat Company, Limited, against Hanbury, ceased to be a distinctive mark,—but it is due, among other things, to that which is pointed out by Vice-Chanceller Page Wood in his judgment, the personal connection of the Baron with the plaintiff Company formed as it was in 1863, and which continued down to his death. It was also continued by the analysis all this time by him and Dr. Pettenkofer, and since then by Dr. Pettenkofer and Dr. Hermann von Liebig. Nobody else has a right to assert, that they have distinctly a right to the reputation of having from the time of the Baron's first connection with the Fray Bentos Company down to the present time had the advantage of having been able to put their goods in the market with the certificate and analysis of the Baron and Dr. Pettenkofer, and after that of Dr. Pettenkofer and Hermann v. Liebig. Now, therefore, that being so, the question is whether or not the defendant suggested, it was not asserted that he had alleged it, that that personal connection exists between his extract and the Baron, and that he has the advantage of any such supervision or control of the Baron. It was said that the word "Baron" and the picture itself did suggest that there was a personal connection between the defendant and the Baron, so as to induce people who bought to believe that goods sold by the defendant had received that analysis and was the product of that personal connection existing between them, so that, in point of fact, if that were true the defendant was able to pass off his goods as the goods of the plaintiffs. Now the reputation of the plaintiffs and their mode of selling was this: they sold in pots, like the pots I have in my hand. (The learned Judge then contrasted the articles as made up for sale by the plaintiffs and the defendant, saying) It seems to me, and the conclusion I have come to is, that the distinctive marks by which the plaintiffs' goods are to be distinguished from anybody else's are to be found in these wrappers and envelopes, and also in their advertisements. I suppose I must not allude to my own personal knowledge, but I may say that I never heard of Dr. Pettenkofer before this case, but I have heard of the name of "Liebig." Whether you call him "The Baron" or "The Professor," or whether, as I think I put it in the argument, you allude to him as a man who wore a blue coat with yellow buttons, does not matter. The thing which is wanted is the thing which Baron Liebig invented and discovered, and brought into practical use, and that is the thing which has become public. The plaintiffs' witnesses stated that they always understood that purchasers asked for "Baron Liebig's Extract of Meat" when they wanted the plaintiffs', but they also stated that the mere use of the term "Liebig's Extract of Meat" would have the same misleading effect. On the other hand, the defendant called witnesses. They said that they did not understand that "The Baron" was anything more than "Liebig." I really think if I had to decide the case upon the weight of evidence that I could not say which side weighed the most. Of course, the great question for me now is to use my own eyes. I am a juryman on this occasion as well as a judge. I have got to determine whether or not I can come to the conclusion that there has been here such a user of marks and brands by the defendant as is reasonably calculated to deceive people into the belief that they have got the plaintiffs' goods. These are the two pots. They are similar in two respects, that is to say, they are both of stoneware, and they are both round; but they are different in size, for, although they hold the same quantity, one is short and the other is tall. I suppose I am now to convert myself into an unwary buyer; I must make myself unreasonable and ask myself a number of questions. Being an unwary buyer, and a supposed ignorant man, and wanting to purchase Liebig's Extract of Meat, I am to suppose that I went into a shop wanting a very good article, and this pot is put into my hands, and I, finding it very good, go to that shop again and ask for some more of that extract, and they give me *this*; then I should say, "Why, goodness, gracious! that is not like the other; there is a capsule instead of there being a trade mark; there is no caution that none is genuine unless the label round the pot is intact." I find here it says, "Baron Liebig's Extract of Meat, guaranteed by R. W. Anderson." If I were relying on the reputation of Liebig, Pettenkofer, and Hermann Liebig, I should say, "Where are the signatures of Hermann Liebig and Pettenkofer? Let me look at their signatures. I do not see their signatures. Where is the blue ink signature of Justus von Liebig?" No, there is nothing of the kind, but it is "guaranteed by Anderson." Then round the capsule there is this: "All Baron Liebig's Extract of Meat guaranteed by me bears my signature thus: Guaranteed by R. W. Anderson." It is said that the use of the word "Baron" indicates a personal connection with Baron Liebig different from that which would be indicated by the use of the word "Liebig." On the other side comes a picture of the Baron, a very intelligent face, and underneath is written "Baron Liebig." It is said also that that has the same effect. But then, I must take all the points of difference as well as all the points of resemblance and I must confess I am inclined to believe those gentlemen who gave evidence for the defence. I am not satisfied with the plaintiffs' case that unwary purchasers might be deceived. Purchasers must use their eyes. Of course I know there are persons who will run against posts at railway stations; so there are people who do not use their eyes, and who buy things which they are said to be deceived by. In this case, like all others, if the plaintiffs say that the defendants have been guilty of culpable conduct, they must make out that conduct by reasonable evidence. It is said that vague conjectures are sufficient. I think it must be more than that. I think that the liberty which there is for every man to sell his goods by the title which he thinks most attractive should not be restrained unless it is proved that what he is doing is reasonably calculated to deceive. Something turned on the question whether there had been any intention to deceive.

If a person were endeavouring to sail as near as he could to the wind, and therefore has done just enough, as he thinks, to sell his goods, one would look on his marks with a very different eye, and would look very carefully at his mark to see whether or not he had infringed. If I found it to be the case, as Mr. Anderson stated, that he had undertaken this as a commercial speculation in the belief that he had not infringed anybody's mark, I must have very strong evidence to prove the contrary. What he said was, "I know all the marks in the trade. I considered this to be a distinctive mark. I did not know that anyone used the word 'Baron,' and I never knew that anybody had used the picture." There really was no evidence of anything else, unless there was evidence from the similarity of the things. Of course one implies to everybody the reasonable consequences of his own acts; therefore, if a man does put into the market a thing which is a copy of a portion, at all events, or the whole of a man's mark or reputation, and then he puts in some slight distinctions which nobody would observe, you imply to him the reasonable consequences of his own acts, and you would say "You are a fraudulent man;" and I should not listen to his oath when he says, "I am not a fraudulent man, and did not intend to do it fraudulently." That was the principle which Mr. Higgins relied upon so strenuously, and that was the principle which was laid down in the case of Seizo *v.* Provezendo. That was a case where Baron Seizo sold sherry with a crown, calling it the "Seizo Crown Sherry." Another man, who happened also to have been a baron, put his coronet upon a cask of sherry, calling it "Seizo," with the addition of something else and he said none would mistake the two. But the Court said:—Here is a crown, and your coronet is very much like it, and then there is the word 'Seizo,' which is common to both." Then there was the Two Elephant trade mark case of Orr-Ewing *v.* Johnstone. In that case the plaintiff's cotton or twist was known by the mark of two elephants. The other man took two elephants, but he put their heads in a different way, or something of that sort, to the two elephants of the plaintiff, and then he put in his marks, which, if read carefully through would be found not to be exactly the same; but as there were two elephants, the Court came to the conclusion that he had done that which was in effect sailing as near to the wind as he possibly could. It was the same in the White Selvage case. In that case also they had taken a distinctive mark; but in the original when the mark was put on the stuff it did not show until it was dyed, which made the differences disappear and then it resembled in all respects the plaintiff's. Then there was another case, in which the same principle was laid down, which is known as the "Dog Head Beer" case. It was the case of Reid *v.* Richardson. One man put the head of a Mount St. Bernard dog and the other man put the head of a terrier dog. The plaintiff's beer had become known as the "Dog Head Beer." In the present case I must say that it is for the plaintiffs to make out their case. Taking the evidence and using my own eyesight I have come to the conclusion that the plaintiffs have not made out that case which I think they ought to make out to establish a case, not merely of fraud, but of unconscientious and continued fraud. Therefore my judgment will be for the defendant.

Defective Lime Water.

At Longton, on Wednesday, November 8, before J. H. Goddard and J. F. Wileman, Esqs., Mr. John Lichfield, chemist, High Street, was charged with selling lime water, which was not of the strength required according to the provisions of the statute.

Major Knight produced the analyst's certificate, which showed that instead of the lime water containing 0·56 grain of lime per ounce, it only contained 0·1 grain per ounce.

Defendant explained that the cost of the lime required was so very small as to preclude the idea of any motive in the amount therein being too little, but that this had come about in consequence of an accidental exposure to the atmosphere. He had always made lime water of the proper strength.

The Magistrates said they quite thought it had been done by an act of carelessness, and not with any intent on defendant's part, and inflicted a fine of 5*s.* and costs. —*Staffordshire Sentinel.*

Obituary.

GEORGE BLANSHARD.

The news of the death of Mr. George Blanshard, late of the firm of Raimes, Blanshard and Co., Wholesale Druggists, Edinburgh and York, will be received with very general feelings of regret and surprise, for until quite recently he was amongst us, hale and hearty as ever.

Mr. Blanshard was born at Angleton, Yorkshire, in 1814. At an early age he was apprenticed to Messrs. J. and R. Raimes, Leith Walk, Edinburgh, in which firm he subsequently became a partner. Eleven weeks ago, while visiting his native place on account of the state of his health, he was prostrated by a paralytic stroke, from which he never rallied. He died on the morning of the 14th inst.

Mr. Blanshard became a member of the Society in 1852. He has been a member of the Council of the North British Branch during most of the time since then, and was elected President for the year 1863–4. Few members took a more lively interest in the affairs of the Branch than he, or have been more regular in attendance at all its meetings, whether business or scientific, although he seldom took a prominent part in the proceedings.

For many years he was a member of the Leith Town Council, and during some of that time occupied a seat on the magisterial bench. It was proposed to raise him to the Provostship, the highest position in that body, but his business engagements led him to decline the honour. He was also for some time President of the Royal Scottish Society of Arts.

Mr. Blanshard was a man of excellent business habits, and a universal favourite amongst a very wide connection of friends. He possessed all the heartiness and geniality characteristic of the Yorkshire gentleman, and these qualities never failed him, notwithstanding the unexpected change of circumstances that somewhat overshadowed his later years.

He is survived by his widow and a family of two daughters and four sons, the eldest of whom is engaged in the establishment of Messrs. Raimes at York.

Notice has also been received of the death of the following:—

On the 26th of September, Mr. John Francis Garland, Chemist and Druggist, Marshfield, Gloucestershire. Aged 52 years.

On the 26th of October, Mr. John Stovin Woodruffe, Chemist and Druggist, Queen Street, Hull. Aged 59 years.

On the 28th of October, Mr. Charles Philip Heyland, Chemist and Druggist, High Street, Redcar. Aged 39 years.

On the 2nd of November, Mr. Robert Fincham, Pharmaceutical Chemist, Baker Street, W. Aged 72 years. Mr. Fincham had been a Member of the Pharmaceutical Society since 1842.

On the 4th of November, Mr. William Walter B. Stoddart, Chemist and Druggist, Grafton Lodge, Sneyd Park, Bristol. Aged 28 years. Mr. Stoddart had been an Associate of the Pharmaceutical Society since 1869.

On the 6th of November, Mr. John Stafford, Chemist and Druggist, High Street, Ross. Aged 42 years. Mr. Stafford had been an Associate of the Pharmaceutical Society since 1869.

On the 13th of November, Mr. Edward Henry Webb Roswell, Chemist and Druggist, Market Street, Lewes. Aged 62 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

PRACTICAL CHEMISTRY; Analytical Tables and Exercises for Students. By J. CAMPBELL BROWN, D.Sc. (Lond). Second Edition. London: J. and A. Churchill. 1882. From the Publishers.

A CONCISE HAND-BOOK OF THE LAWS RELATING TO MEDICAL MEN. By JAMES GREENWOOD, Barrister. Together with a Preface and Chapter on the Law relating to Lunacy Practice. By L. S. FORBES-WINSLOW, M.R.C.P., etc. London: Baillière, Tindall and Cox. 1882. From the Publishers.

THE CONTAGIOUSNESS OF CONSUMPTION and its ANTISEPTIC TREATMENT. By J. BURNEY YEO, F.R.C.P., etc. London: J. and A. Churchill. 1882. From the Publishers.

DIET FOR THE SICK, being Nutritious Combinations suitable for Severe Cases of Illness. By JAMES RIDGE, M.D., etc. Second Edition. London: J. and A. Churchill. 1882. From the Publishers.

DIE PARFUMERIE-FABRIKATION. Auf Grundlage eigener Ehrfahrungen veröffentlicht von Dr. chem. George William Askinson, Parfumerie-Fabrikant. [Chemisch-technische Bibliothek.] Vienna: A. Hartleben. From the Publisher.

A DICTIONARY of MEDICINE, including General Pathology, General Therapeutics, Hygiene, and the Diseases peculiar to Women and Children. By Various Writers. Edited by RICHARD QUAIN, M.D., F.R.S., etc. London: Longmans, Green and Co. 1882. From the Publishers.

DIE CHINARINDEN in pharmakognostischer Hinsicht dargestellt. VON F. A. FLUCKIGER. Berlin: R. Gaertner. 1882. From the Publisher.

Notes and Queries.

[739]. OIL OF PEPPERMINT.—On mixing Hotchkiss's oil of peppermint with rectified spirits of wine a bright green colour was produced.

Similar spirit and oil have been repeatedly mixed before without any like result.

Could anyone kindly explain the reason?

ASSOCIATE.

[740]. BLUE COLOUR FOR PIPE CLAY.—Can any of your readers furnish me with a good receipt for colouring pipe clay a deep blue, as used for pipe-claying doorsteps, etc.?

FORTH.

[741]. SMELLING SALTS.—"Agricola" will be glad of a good formula for a pungent smelling salt, that will not require the addition of any liquor ammoniæ.

[742]. POLYGRAPHIC INK.—Would some reader kindly give me, through the Journal, a formula for a good black polygraphic ink?

EURETES.

[743]. PRESERVATION OF ESSENCE OF LEMON.—Could any of your readers inform me the best means of preserving essence of lemon? I have a considerable quantity of 1881 essence, and wish to prevent it becoming terebinthinous. I have been advised to mix it with equal parts of alcohol, the same as is frequently done with oil of lavender. But before doing this I thought I would ask the question through the medium of the Journal.

W. L.

[744]. POTASH POWDERS.—Will someone kindly inform me how to send out potash powders for a 3-pint gasogene, stating strength, etc.?

PULVIS.

Correspondence.

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

THE CURRICULUM.

Sir,—In perusing Mr. Candy's letter in a recent issue, on Dr. Greenhow's report and the curriculum, I regret to see the one-sided view he takes of this important question. The prevailing ideas seem, to postpone the matter to some other time, and will it improve our position when in operation?

There can be no doubt that the present system of "cramming" in many of the schools will tell, in years to come, and those who have gone into a thorough course of training are the men who will rise in their profession.

Until the curriculum becomes compulsory, the large majority of the candidates for our examinations will be prepared in this way.

Your correspondent asks, "Are there any businesses which would utilize to the full the scientific knowledge which it is proposed to render imperative?" I affirm that in every pharmacy this scientific knowledge is necessary and requisite, and till the proper means of acquiring it is made compulsory, the majority will not seek them of their own accord. We must move with the times and not rest satisfied on what was done ten years ago.

It would be a poor reward for the man who has expended both time and means in taking the Major qualification to be classed on a level with the ordinary tradesman.

There is no doubt when the curriculum is established we shall get a better class of candidates for examination; men who, I hope, will have some ambition to elevate the profession to which they belong, and who will not be discouraged by hard work from attempting to attain the highest point.

I believe when medical men in the country, and those places where they now compound their own medicines, find they can rely upon men who have had a thorough scientific training, and possess an intimate knowledge of their business, they will see it is to the advantage of both that their medicines should be prepared by the pharmacist.

This, I can testify from my own experience, is working well in many towns.

Liverpool. C. J. S. T.

THE POWERS NOW POSSESSED BY INSPECTORS OF WEIGHTS AND MEASURES.

Sir,—Permit me to draw attention to the power now possessed in certain districts by inspectors of weights and measures of entering the shops of dispensing chemists and examining the weights and measures used therein.

This appears to me and others to be an odious, degrading and needless interference with a delicate and responsible occupation, already overburdened with peculiar distractions and anxieties. The increasing competition arising from co-operative stores causes a growing reluctance to pay the chemist for his skill, that one possession on which he must rely. It fell to my lot to prepare a memorial for presentation to the Hastings Town Council, setting forth the objections felt by chemists to this procedure. This memorial was signed by twenty-one chemists of the Borough of Hastings and St. Leonards, and received the hearty assent of an influential portion of the medical profession there. It was stated that this inquisitorial power was regarded with deep regret and annoyance. That "our weights and measures are those of the British Pharma-

copœia, a standard work containing minute directions for the preparation of medicines, with delicate physical and chemical tests and all necessary details. To us the law assigns the responsible and arduous task of preparing, compounding and dispensing medicines at all hours. We are necessarily trusted with this, the greater matter; the greater includes the less; why deem us unworthy of trust in this lesser matter, the use of our own true medicinal weights and measures in dispensing, and why this needless and vexatious interference with our duties? This opens the door to petty tyranny and the odious calling of the informer, from which we have hitherto been free."

Dispensaries of various kinds and surgeries are exempt from the visits of the inspector; it is exceedingly desirable to obtain the same privilege for dispensing chemists who are undoubtedly fully deserving of it. It will be remembered that measures stamped with the legal mark of one district are legal in all others, hence it is usual to purchase measures from the manufacturer which have been duly tested and stamped. This should suffice, as it affords every security.

It will, probably, be necessary to place before Parliament a short Bill exempting dispensing chemists from the operation of that part of the Apothecaries' Weights and Measures Act which empowers inspectors to visit the shops of chemists. This can be easily accomplished. It will then rest with the dispensing chemists of Great Britain to give a hearty and earnest support to this measure by numerous petitions and by letters to as many members of Parliament as possible. The removal of an odious, humiliating and ridiculous espionage is well worthy of some continuous effort.

I shall be glad to receive any suggestions or assistance.

Hastings. G. A. KEYWORTH, F.C.S.

CITRINE OINTMENT.

Sir,—Your correspondent, Mr. J. E. Saul, writing in last week's Journal on this subject, appears to be unaware of the fact that the question of the composition of "golden ointment" was set at rest some ten years (it may be more) since, when it was shown to be a well-prepared ointment of red oxide of mercury. I am unable, at the present moment to lay my hand upon the paper in which this result was given, but it was published (if not in our Journal) in one of the journals devoted to pharmacy. Be this as it may, he may easily and quickly solve the question for himself thus, as I have just done:—Take about ·5 gm. of the ointment and place it in a test tube with about 4 c.c. of water to which a few drops of nitric acid have been added; boil the mixture gently for a short time, when the red colour will be seen to fade and finally disappear; pour the whole on a filter and place a drop of the filtrate on a gold coin; on placing an iron key in contact with both the coin and the drop of liquid, the mercury will be deposited on the coin and the stain so produced will disappear on heating. Further tests may be applied to the filtrate, but no evidence of an arsenical compound was to be found in the sample of "golden ointment" I thus examined. Incidentally I would mention that I am unable to agree with the statement made in Mr. R. A. Cripps's paper on "The History of Citrine Ointment," that "golden eye salve" is an ointment of yellow oxide of mercury; if by this designation he means the well-known proprietary article—for the colour alone would seem to negative this assumption, it being a bright red and not yellow colour; the colour, in fact, that very finely levigated red oxide of mercury would have. Query, how has Mr. Cripps satisfied himself that it is an ointment of yellow oxide of mercury?

It is somewhat curious that the colleges should have introduced citrine ointment (ung. hydrag. nitratis) as a substitute for "golden ointment," which it could not in any way have resembled; but that they did so we have it on the authority both of Christison and Squire. Quite as curious also is the oft-repeated statement in text books, both English and foreign, that it is an ointment of sulphuret of arsenic, some giving it as orpiment (Dorvault, Beasley, etc.), others as realgar (Paris, Gray, etc.), though in point of fact it resembles neither. The facility with which errors are perpetuated must have struck most of us, and I entirely agree with the expression made use of by a late President of our Society, that there was quite as much good work to be done in verifying or otherwise the results of others, as in striking out new branches of research. There is one explanation, however, which may account for these discrepancies; it is well known that many of these proprietary preparations have varied considerably from what they were originally, and it may, after all, be quite true that "golden ointment" of past time was prepared with a sulphuret of arsenic.

I trust that Mr. Cripps will pursue his researches into the composition of citrine ointment, as there is still much to be worked out.

Tottenham High Cross. ALFRED E. TANNER.

Sir,—It is very easy for any person to criticize a paper which must have cost Mr. Cripps hours of study and patient research, but I think Mr. J. E. Saul is justified in calling attention to an error, viz., that "golden eye salve" was "an ointment of yellow oxide of mercury."

Mr. Cripps says Singleton's eye salve was "an ointment of yellow oxide of mercury." How this mistake was made I know not.

Paris most distinctly says:—"Under this name is sold a preparation, which consists of sulphuret of arsenic (orpiment) with lard, or spermaceti ointment." But he adds:—"The unguentum hydrargyri nitrico-oxidi of the London College is also sold under the same title."

Mr. Cripps might have said whether we are really entitled to call the ancient "unguentum basilicum flavum" the "unguentum balsilicum," and the linimentum arcæi of last century by the name "citrine." It is not my object to go further to prove Mr. Cripps's exertions to be at fault than in this respect, that if he is right, any yellow ointment may be called "citrine;" but I hold the "yellow ointment," or "unguentum citrinum" of the Edinburgh Pharmacopœia, 1722, is the real citrine ointment, from which all other colleges have copied, and that was a mercurial ointment—an ointment of "nitrate of mercury."

It will thus be seen that although an ointment of red oxide of mercury was sold as Singleton's, it did not possess the colour of golden eye salve. It was a substitute.

Christison says:—"The object of the officinal processes for this important ointment (unguentum citrinum) has been to imitate, as exactly as possible, a nostrum, well known by the name of the golden eye ointment."

Mr. Cripps does not mention the fact that "sandarach" or "sandaracha" was used long before the Christian era as an application in ophthalmic affections. In Pliny's time it was the red variety, or realgar, that was most esteemed. Whole pages might be written upon this subject, but of one thing I am convinced that Singleton's eye ointment was not an ointment of yellow oxide of mercury, but of yellow sulphuret of arsenic (As_2S_3)—orpiment.

Northallerton. HENRY BROWN.

Apprentice.—We thank you for the communication; similar absurdities are continually met with, but are hardly worth repeating in print.

Querist (who should have sent his name and address).—Such a preparation would be subject to duty, the only evidence of the payment of which, that we are acquainted with, is the presence of the Government stamp.

S. P. Q. R.—Brush the coins carefully with very dilute acid, then wash them thoroughly in water.

T. W. L.—The definite oleate of mercury is used and the "heavy petroleum oil" is the portion of petroleum having a high boiling point.

J. D. Morgan.—The chloride of calcium will absorb moisture from the atmosphere. Mix the ingredients each in as dry a condition as possible, and send out the divided powders in a closed bottle.

Fritz.—Use 1 grain of very dry soap to each pill, and the pil. galb. co. in powder.

A. T.—Cacao butter.

J. White.—As a rule crystalline substances, when dispensed, should be in powder, but this is not necessary with quinine.

Zinc.—Acid. hydrocyan. dil., B.P.

Medicus.—Seven parts of syr. simp., B.P., contain six parts by weight of sugar; the calculation is easy.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Baynes, Brown, Bumpstead, Orton, Abraham, Benger, Illingworth, Allen, Martin, Davies, An Old Subscriber, Chemicus, W.L.P.

1882. SIXTEENTH SEASON.

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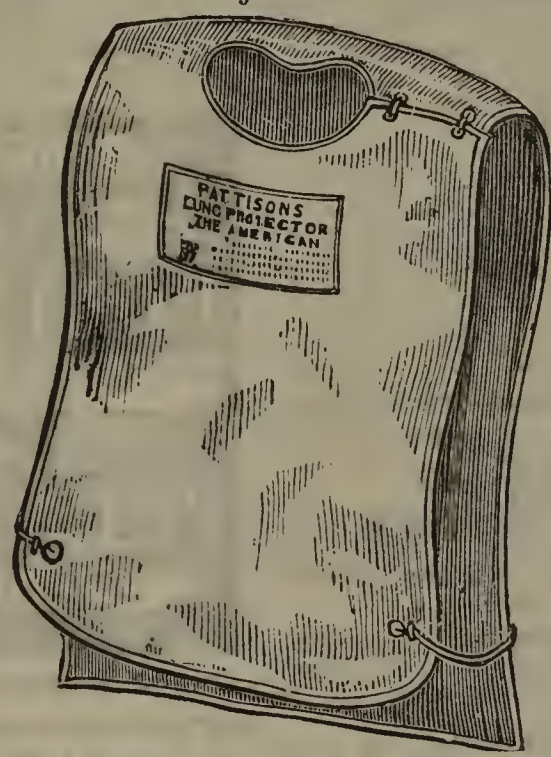

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The American, Six sizes	...	20/-	28/-	36/-	44/-	54/-	62/-	,,
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	No. 00	No. 0	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	
Prices, Eight sizes	4/-	6/-	8/-	10/-	12/-	16/-	20/-	24/-	per doz.

All in Scarlet and White, and made in same Wool as the "Lung Protector."

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FELT CHEST PROTECTORS, C QUALITY, single and double, each in five sizes.
At lower prices than above, and equal to **BEST** of other makers, but are NOT recommended.

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Neuralgia, Headache, &c.

MENTHOL CRYSTALS are the only safe remedy for **Neuralgia, Headache, Earache, Toothache, Sciatica, &c., &c.** This drug is applied externally by rubbing the parts affected for a few seconds, when an agreeable burning and then cold sensation occurs, followed by immediate relief.

Crystals	- - -	1s. per ounce.
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To counteract cutting houses, and to keep up the Retail Price, the MANNA CAKE is supplied to *one Retail Chemist only* in each district, who has Exclusive Wholesale Profits. *Local Chemists must of necessity order through the Agent.* British Wholesale Drug Houses need not apply. 180,000 have now been ordered. Quantity sent to suit population. All newspaper arrangements are made by the agent at maker's expense. Among recent acceptances are:—Mr. J. Munday, Cardiff, 8 gross.—Mr. K. James, Beverley, 3 gross.—Mr. Gibson, North Shields, 6 gross.—Mr. Brigstocke, Carmarthen, 3 gross.—Mr. Jepson, Sheffield, 12 gross.—Mr. Huband, Tamworth, 2 gross.—Mr. Fyvie, Coleraine, 8 gross.—Mr. Alexander, Galashiels, 4 gross.—Mr. Thomason, Birmingham, 50 gross.—Hamilton & Jones, Bangor, 4 gross.—Mr. Stroud, Bristol, 20 gross.—Mr. Stephens, Huddersfield, 150 gross.—Mr. Kendall, Blyth, 325 gross.—Mr. Davidson, Dundee, 125 gross. N.B.—The output is eight times what it was in June last. For Terms send Stamp to Depôt, 268, Walton Rd., Liverpool.

JETTINE,

The only preparation which does not injure the leather.

Produces a perfectly black and permanent gloss, which will not rub off even when wetted, nor soil the most delicate article of dress.

It is invaluable for Ladies' and Children's Boots and Shoes, Waist Belts, Travelling Bags, &c. Each bottle is neatly packed in a cardboard box, and contains a sponge mounted and ready for use: thus JETTINE may be applied without soiling the hands.

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Evans, Lescher & Webb, 60, Bartholomew Close, E.C.
Hovenden & Sons, 5, Gt. Marlboro' St., W.
Lynch & Co., 171A, Aldersgate St., E.C.
Maw, Son & Thompson, Aldersgate St., E.C.
May, Roberts & Co., Cowcross St., E.C.
Sanger & Sons, 150, Oxford St., W., or of
E. Penton & Son, 1 and 3, Mortimer St., W.

KEMMERICH'S
EXTRACT OF MEAT,

According to analysis, is the best. Prepared at the Company's own Works, Santa Elena, South America. Sole Agents, ROCKWOOD & Co., 12, Long Lane, E.C. Agents required.

Dr. ARTHUR HILL HASSALL, M.D.: "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

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Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
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Guaranteed precisely as made in the laboratory, and under the superintendence of the late Richard Battley.
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CAUTION.—Circumstances which have come to the knowledge of Andreas Saxlehner, Buda Pest, Sole Proprietor of the Hunyadi János Spring, compel him to WARN the British Public against SPURIOUS IMITATIONS. To secure genuineness, purchasers should see that every bottle has on the LABEL the name of

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NATURAL APERIENT MINERAL WATER,

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The STRONGEST and BEST aperient Water.

For Analysis and Samples apply to E. Gallais & Co., 27, Margaret Street, LONDON, W.—Sold by all the principal Chemists, &c., at 2s.

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FREDERICKSHALL (5 Cases, 6d. per Case less), 24/6 Case, 30 bots.; 34/- Case, 60 ½-bots.

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HUNYADI JÁNOS (10 Cases, 3/- and 5/- less), 30/- Case, 25 bots.; 50s. Case, 50 ½-bots.

SELTZER ..	11/-	Hpr.,	25 bots.
,, ..	15/-	Hpr.,	50 ½-bots.
PULLNA ..	18/-	Case,	20 bots.
,, ..	30/-	Case,	50 ½-bots.
VICHY ..	31/-	,,	50 bots.
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CARLSBAD ..	37/-	,,	50 bots.
KISSENGEN ..	42/6	,,	50 ,,
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Low quotations given for quantities taken from vessels while discharging.

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SPIRITS OF WINE

CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

56 over proof, 19/10 net, prompt Cash, for 5 gallon quantities; also Finest Orange Wine and Sherry for medicinal purposes.

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Duty free for Exportation—also best Methylated Spirit at lowest prices.

"LENTILLA"

Of all Patent Medicine Houses, Druggists' Sundrymen, &c., or Proprietor, at

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Cubebs Stramonium and Cannabis Ind, (soothing). Relief in Asthma, Throat, Cough, Bronchitis, Influenza. A specific against fogs. Boxes (12) 1s., 9s. per doz.; (36) 2s. 6d., 24s. per doz. Full directions. EVANS, LESCHER & WEBB, London. EVANS, SONS & CO., Liverpool. Samples gratis, post free.

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of membrane, each containing 15 drops Pure Maranham

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IN THE

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THE MANCHESTER COLLEGE OF PHARMACY,

225, OXFORD STREET, MANCHESTER.

Principal, Mr. W. S. TURNER, Pharm. Chem., M.P.S.

Fee for Instruction:

Minor or Major ... ... £3 3s. per month.

Including all Chemicals and Apparatus.

Fee from January to April, 1883 ... ... **£8 0 0**

Students can obtain comfortable rooms near the College at a very reasonable charge. A very complete course of Evening Classes in the subjects required in the Minor and Major is now being conducted.

Mr. Turner makes it his great endeavour to render the work he is doing thorough and useful, and he is glad to know that he has already won no mean commendation for his system of teaching.

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Albatum or White Rouge, for Cleaning Gold, Silver and Plated Goods.

Since its introduction as a substitute for the ordinary Rouge, a quarter of a century ago, the sale has amazingly increased both at home and abroad. A trial is only needed to prove its superiority over other Plate Powders in use. Sold in Boxes at 1s. and 2s.; Tins, 6s.

7, PONT STREET, BELGRAVE SQUARE, and 48, BELGRAVE ROAD, S.W. } **LONDON.**

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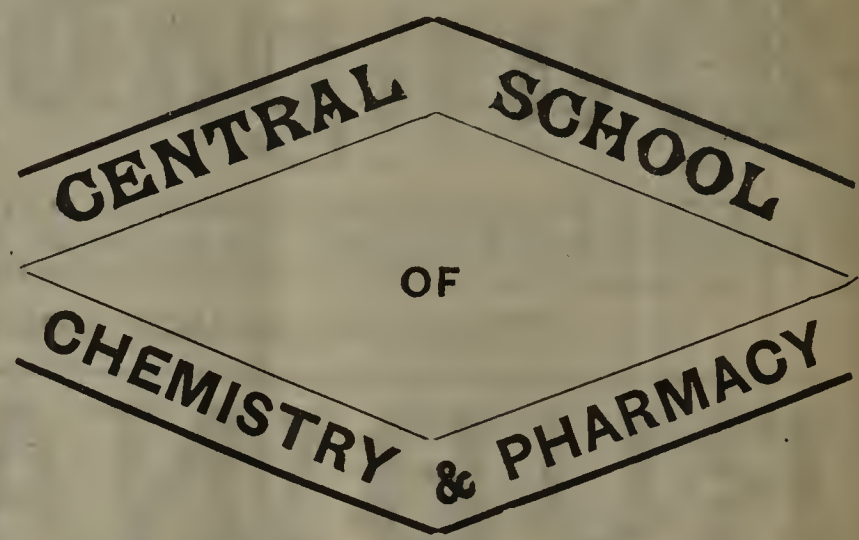

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

At the examinations held last month the following students from this School were successful.

6 Major Candidates were recommended to present themselves, the following **4** passed.

Mr. Foden. | Mr. Rouw.
„ Parker. | „ Steel.

9 Minor Candidates were recommended to present themselves, the following **7** passed :—

Mr. Cooper. | Mr. Pinchen.
„ Maddox. | „ Prothero.
„ Ombler. | „ Surman.
Mr. Tottle.

1 Modified Candidate presented himself and passed :—

Mr. Colvin.

JUDD'S

CHEAP

MINOR and PRELIMINARY CLASSES

Are being arranged for the Examinations of 1883. The time required for successful preparation varies from six to twelve months. The fees include books, apparatus, &c. No extras whatever. Apply personally, or with stamped address, to

Mr. H. JUDD,

15, Compton St., Brunswick Sq., W.C.

(Late 29, GREAT CORAM STREET.)

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(From the Royal School of Mines),

130, CAMDEN ROAD, N.W.

THREE of my Students passed at the October Minor, also TWO at Preliminary.

Laboratory close to Gower Street Station.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 6d. Latin Grammar and Cæsar Simplified, 1s. Minor.—Equations Simplified, 1s. Illegible Autograph Prescriptions, 1s. Minor Questions, gratis. Notes on Dispensing, 1s. Prescriptions given at the Minor, 1s. For "How to Prepare for either Exam.," enclose stamped envelope, Chemist, care of Mr. J. Edwards, Wye, Kent. Herbarium of Plants, 6s.

THE WESTMINSTER COLLEGE OF CHEMISTRY & PHARMACY.

Director:—Mr. G. S. V. WILLS, F.L.S., F.R.M.S., Fellow of the Royal Botanic Society.

The question why so many Students pass their Examinations from this College whilst so few succeed from other sources is repeatedly being asked.

The problem is easily solved. The teaching is so thoroughly practical, that students of ordinary ability cannot fail to comprehend and master the various subjects.

Those students who read up for Examination from books, or who attend a School of Pharmacy, where there are not the facilities for learning the subjects practically, not only fail to satisfy the Examiners, but are also found to have acquired a very incomplete and confused idea of the subjects they have studied.

As a proof of the thoroughness of the Education in this College, it is only necessary to refer to the result of the Minor Examinations held in London this month. It will be seen that whilst ONLY 11 succeeded in passing from all other Schools combined, 18 were successful in passing from the Westminster College.

MINOR EXAMINATION, London, October, 1882.

From Westminster College alone, 18.	From all other Sources combined, 11.
Mr. F. T. Brough.	Mr. H. S. Cooper.
„ C. E. O. Betts.	„ M. Dodsworth.
„ W. Bray.	„ T. Fawssett.
„ A. Cardwell.	„ F. W. Maddox.
„ H. C. Dadson.	„ W. F. Norman.
„ F. G. Deacon.	„ W. J. Pinchen.
„ G. S. Dunn.	„ G. R. Prothero.
„ C. P. Dye.	„ J. Robertson.
„ W. A. Easte.	„ E. F. Salmon.
„ J. F. Gummow.	„ T. W. Surman.
„ T. E. Heynes.	„ H. J. Tottle.
„ R. D. Millward.	
„ D. Rees.	
„ T. Hudson.	
„ A. Pell.	
„ R. W. Rees.	
„ F. G. Treharne.	
„ G. A. Yates.	

The following Students were also successful in passing their Examinations from this College.

MAJOR.

Mr. E. Fletcher. | Mr. MacDermott. | Mr. R. F. Roper.

MINOR (Edinburgh).

Mr. A. G. Cobden. | Mr. F. P. Moore. | Mr. R. W. Watson.

PRELIMINARY.

Mr. Bertram. | Mr. Mahood. | Mr. N. Reid. | Mr. Spry.

On Monday, January 1st, 1883, the next complete course of Lectures and Classes will be commenced for the February and April Examinations.

FEES *(from present date.)*

Until the December Examination	**£2 2s.**
Until the February „ ...	**£6 6s.**
Until Qualified (Minor)	**£10 10s.**
Until Qualified (Minor and Major)	**£15 15s.**

Students can enter at any time, but are strongly advised to enter at the commencement of a Course of Lectures.

For Prospectuses and other information, apply to

Messrs. WILLS & WOOTTON,

Trinity Square, London, S.E.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. Baxter, Secretary.

TO WESTMINSTER COLLEGE STUDENTS.

A STUDENT (January to July), residing near Crystal Palace, offers two Students a cheerful home (private), with every comfort. One guinea a week, second class fare to London included. Address first, H. B., 169 Brockley Road, S.E.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. Dawes, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

ENGAGEMENTS WANTED.

PERMANENCY as Manager (with view to succession). Age 37. Married. Accustomed to respectable class trade. 9 years in last engagement. Highest references. State full particulars, T. H. North, care of Mr. Ingersent, Cathedral Close, Exeter.

AS Junior. Age 18. 3 years' experience. Total abstainer. W. Puckey, 63, Golborne Rd., Upper Westbourne Park, W.

AS Dispenser. In or out-door. Surgery or Institution. Brought up Chemist. 7 years in last situation. Age 44. Single. T. John Whitworth, Goonlaze House, St. Agnes, Cornwall.

AS an out-door Assistant, or to take the Management of a Branch. Registered. Age 37. 2 years' excellent reference from last employer. H. E., Messrs. Compton & Son, Chemists, Margate.

FEW hours employment daily in Dispensing or Retail. Disengaged at 3 p.m. Major qualification. Highest references. Age 24. F. T., 9, Holland Grove, N. Brixton, S.W.

AS Junior. Age 20. 5 years' experience. Good references. S. Fowle, New Town House, Hatfield, Herts.

AS Locum Tenens. By a gentleman of long experience (Pharm. Chemist), in first-class Retail, during illness, absence, &c. Most satisfactory reference. Medicus, 2, Chichester St., London, W.

AS Junior Assistant in a good Dispensing house. Age 20. Height 5ft. 11in. Desires a permanency. Disengaged December 1st. 5 years' experience. D. Kingan, 22, London Rd., Brighton.

AS Assistant or Manager. Aged 31. 16 years' varied experience, Dispensing, general Retail and Prescribing. Reference good. Locum Tenens till permanently engaged. T. P., 23, Cornwall St., Fulham Rd.

AS Improver. Age 19. Height 5ft. 9in. 4 years' experience. Good reference. Now disengaged. F. W., Mrs. Noble's, Barmby, near Howden, E. Yorks.

ENGAGEMENTS WANTED.

LONDON.—As ASSISTANT in good Dispensing business. Minor and Hall qualifications. Good references. Disengaged. Age 22. Height 5ft. 9in. CHEMICUS, 32, Huntley St., Tottenham Court Rd.

ASSISTANT. Now disengaged. Age 25. Can Prescribe and Extract Teeth. In or near London preferred. 4 years' reference given. $CHCl_3$, 68, Lambeth Rd., London, S.E.

PART time engagement. During latter part of day. Hours may be arranged. Thoroughly conversant with business. Pharmaceutical Chemist. J. GARRETT, Kineton, Warwick.

AS ASSISTANT. Good class Retail and Dispensing. Country preferred. Age 25. 9 years' experience. Minor qualification. OMEGA, 74, Mountgrove Rd., Highbury, London, N.

AS Temporary ASSISTANT. Age 25. Good references and testimonials. Apply, with full particulars of salary, &c., to W., Mr. Hazard, Chemist, Bournemouth.

AS ASSISTANT for a few hours daily. Minor qualification. Age 28. London experience. T. W., 2, Selborne Rd., Denmark Hill, S.E.

AS JUNIOR or IMPROVER. 5½ years' experience. 18 months in good class London business. Total abstainer. X. Y. Z., 86, Rupert St., Reading.

AS ASSISTANT. 13 years' experience. Minor. Age 27. R., 94, Tachbrook St., Pimlico.

AS out-door ASSISTANT or MANAGER. Major qualification. Age 38. Good reference. London preferred. CHEMICUS, 168, High St., Camden Town.

AS ASSISTANT to Chemist and Druggist. Passed Cambridge Local, but has very slight knowledge of the business. Aged 27. Small salary and board. J. RICHMOND, 37, Millman St., W.C.

AS MANAGER or ASSISTANT. In or out-door. Qualified. Over 15 years' varied experience. Good Dispenser and Prescriber. Can Extract Teeth. Now disengaged. Good references. Usual particulars to NEMO, Bank Cottage, Withington, near Hereford.

BY a qualified man, a situation as MANAGER, with a view to partnership or to purchase. Age 26. Apply, T. D. S., 25, Silver St., Durham.

IN France.—As ASSISTANT. Age 28. Major qualification. Speaks French moderately. Good references. Please state full particulars to R. G. ROBERTS, 349, City Rd., London, E.C.

WITH Wholesale or Retail Druggist. Age 18. Have been in present employ over 3 years. Understand general routine of Drug Retail. ALFRED WALTER, 67, Portnaw Rd., St. Peter's Park, London, N.W.

AS DISPENSER, out-door, to a Surgeon, or in a Dispensary. Age 23. Very good references. FARDELL, 1, Dogsthorpe Rd., Peterboro'.

AS MANAGER or SENIOR. Major qualification. Married. No family. CHEMIST, 23, George St., Portman Sq., W.

AS MANAGER or out-door ASSISTANT. Qualified. London and country experience. A good Prescriber and Dentist. CHEMIST, 95, Belmont Row, Birmingham.

AS ASSISTANT. Age 29. Married. Country not objected to. Good references. ALPHA, 3, Clare St., Sutton St., New Wortley, Leeds.

AS JUNIOR or IMPROVER in a good establishment. London preferred. Height 5ft. 5in. First-class references. HUGH PARRY, care of Mr. Allchin, Chemist, England Lane, N.W.

AS out-door ASSISTANT. Senior or Manager. Minor qualification. Age 26. Height 5ft. 11in. 12 years' varied first-class experience. Good references. E. E. C., 15, Compton St., Brunswick Sq., W.C.

ENGAGEMENTS WANTED.

AS ASSISTANT. Out-door. 6 years' experience. Major qualification. Married. Height 6ft. Age 23½. ALEXANDER STEEL, 16, Malfort Rd., Denmark Park, S.E.

AS ASSISTANT in good Dispensing business. London preferred. Age 22. Good references. ALPHA, 47, High St., Lowestoft.

EVENING or part day employment. Well up and good references. Can give a day when required. J., 37, Green Lanes, Stoke Newington, N.

ADVERTISER requires evening employment in return for a small salary. MEDICUS, 43A, Fetter Lane, E.C.

ASSISTANTS WANTED.

BY end of November.—An out-door ASSISTANT. Minor qualification. For a Family Retail and Dispensing business. Apply, stating age, salary required, with references, enclosing carte (if convenient), to R. W. WATSON, 22, Angel St., Sheffield.

AN ASSISTANT, a good Counterman, in a light class Retail, Prescribing and Dispensing business, where one other is kept. Apply, with usual particulars, including all previous engagements and carte (which will be returned), to R. G. J., Hodgkinsons & Co., 198, Upper Whitecross St., E.C.

IMMEDIATELY.—An ASSISTANT. Accustomed to good class Retail and Dispensing. One who has passed the Minor preferred. Age not under 22. Apply with references, stating height, salary required, and enclose carte, to WILLIAM BAXTER (late Dowman), 160, High St., Southampton.

APPRENTICE. — At a Seaside watering-place in South Wales.—A Pharmaceutical Chemist has a vacancy for a gentlemanly and well educated youth as an APPRENTICE. One who has passed, or is prepared to pass, the Preliminary examination will be preferred. A premium required. Apply to GEO. JAMES, Pharmaceutical Chemist, Tenby.

QUALIFIED ASSISTANT. Must be competent to superintend his department. Liberal salary to an energetic and pushing man. Apply by letter to T. W., Holborn Viaduct Subway, Farringdon St., E.C.

A JUNIOR, of good appearance and address, for a Dispensing business. Must write a good hand, and have been accustomed to the best class of Retail. Apply, stating salary and previous experience, and enclosing carte, to EDWD. PEARSON, Nottingham.

APPRENTICE.—WIBMER & WARDLEY, Chemists, Tonbridge (established 1811), have a vacancy for a well educated gentlemanly youth, who has or is prepared to pass the Preliminary examination. Particulars on application.

MANAGER or ASSISTANT. Competent to take charge of a business. Age 25 to 28. Good references required. Apply, stating salary, &c., to R. FITZHUGH, Chemist, Nottingham.

IN a Chemist's establishment.—An experienced ACCOUNTANT, speaking and writing perfectly the French language. Preference would be given to a Chemist's Assistant answering these requirements. Address, PHARMACIEN, Poste Restante, Rue Cambon, Paris.

PARIS.—In a first-class establishment, a Dispensing ASSISTANT is required, speaking French. No one need apply whose character and antecedents will not bear the strictest scrutiny. A liberal salary is offered in return for experience. Good address and serious business habits. Enclose carte (to be returned) with references, to CHEMICUS, Library, 224, Rue Rivoli, Paris.

ASSISTANTS WANTED.

A GENTLEMANLY out-door ASSISTANT. Must be competent to Dispense, good Salesman and counter hand. Apply, with full references, enclosing carte de visite, and stating salary expected, to GOULDINGS, Chemists, Cork.

PAU.—An ASSISTANT. Lodging and board provided, and £6 for journey, and if satisfaction is given, same for return journey. Wages, 100 fr. a month; if a Major man, 120 fr. a month. Communicate direct with M. GARDERES, Pharmacien, of Pau.

MANAGER. Able to Prescribe and Extract Teeth. Out-door. State age, height, experience, salary, and references. I. JONES, Chemist, 185, Westminster Rd., Kirkdale, Liverpool.

EARLY in December.—An ASSISTANT, about 21, who has been accustomed to a good Dispensing and Retail trade. Hours 8 to 7.30. Full particulars to FROST & COPE, Chemists, Derby.

IMMEDIATELY.—A competent trustworthy ASSISTANT for a Mixed country trade. A Wesleyan and abstainer preferred. State age, salary, and references, to A. D. CLEGG, Wantage, Berks.

IMMEDIATELY.—An ASSISTANT, competent to Manage a Retail and Dispensing business. One desirous of a permanent situation preferred. Apply personally, if possible; if by letter, stating references, age, married or single, salary required, in or out-door, together with full particulars of previous engagements, to W. WICKHAM, Pharmaceutical Chemist, 509, New Cross Rd., S.E.

AT once.—An ASSISTANT, where one only is kept. A good Dispenser and Counterman, with quick and business habits. State age, height, and send photo., to be returned. A Churchman preferred. HY. MORNEMENT, Great Yarmouth, Norfolk.

IMMEDIATELY.—A JUNIOR or IMPROVER for good country trade. One wanting insight into Prescribing business will find this a good opportunity. Apply, with usual particulars, to ALFRED DUNSTON, 52, Boro', Farnham, Surrey.

IMMEDIATELY.—An ASSISTANT (out-door) for about 2 months. Must be recommended by last employer for sobriety. One accustomed to the routine of a good country business preferred. Address, giving age, salary required, and references, to T. RODERICK, Chemist, Pontypool. Letters not replied to in 4 days declined.

A RELIABLE JUNIOR. Must be accustomed to country trade, with Dispensing and Prescribing. Energetic and obliging, with good address. Apply, stating full particulars, with photo., if convenient, to RANDAL HOW, Chemist and Dentist, 26, St. Clement's, Oxford.

A COMPETENT Dispensing ASSISTANT. Must be well recommended. Apply to Messrs. COOPER & Co., 80, Gloucester Rd., South Kensington, S.W.

A QUALIFIED JUNIOR, of steady business habits. Skilled in Pharmaceutical preparations and Dispensing. Apply to W. MARTINDALE, 10, New Cavendish St., Portland Pl., W.

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3. LONDON, N.—In a thickly-populated locality. Very old established Retail, Dispensing and Prescribing BUSINESS. Held by present owner nearly 20 years. Returns £800 yearly. Net profit above the average. Price about £700.
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5. SURREY.—First-class Retail and DISPENSING. Returns £700 yearly. Handsome double-fronted shop. Good house and large garden. Lease nearly 20 years. Rent low. Price £600.
6. SUSSEX.—First-class Retail and DISPENSING. Returns about £1000. All full prices. Full particulars on application.
7. HERTFORD.—Very old Retail and DISPENSING. Returns £800 yearly, with Proprietary Articles attached. Good profits. Established 60 years. Good house and garden. Price about £700.

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FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XIV.

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Theobromine ..	0·90	1·20	0·43	0·50
Gluten	12·21	18·30	6·45	7·35

and adds:—"Thus we clearly see the nonsense talked by those who, for reasons best known to themselves, are found to palliate, and even support in writing, the 'preparation' of Cocoa by mixing it with starch and sugar."—*Analyst*, April, 1879.

The large Consumption this Cocoa has obtained, combined with the almost universal manner in which it has been recommended by Medical Men, has induced imitations by several manufacturers, which are sometimes substituted for the genuine article.

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The
Pharmaceutical Journal
AND
Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 6th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, the 29th inst., as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

APPROVED CANDIDATES.

1.—BROADWATER, ELIZABETH. Age 64. Oxford. Widow of William Broadwater, a Member of the Society from 1842 to 1853. Was in business at Amersham for twenty-four years. Died in 1866. She is in ill health, and has a daughter, afflicted with epilepsy, dependent on her. *Second application.*

2.—DAVIES, HENRY EDWARD. Age 65. London. Member of the Society from 1842 to 1870, and for many years an annual subscriber to the Benevolent Fund. Has been paralysed for the last three years and is quite helpless. Applicant was in business on his own account in the City of London for twenty-four years, and subsequently Dispenser to the City of London Union for seven years. His a wife, age 54 (suffering from tumour), and two children dependent upon him.

3.—DIXON, MARY ELIZABETH. Age 50. Widow of William Dixon, a Life Member of the Society. Died in 1878, leaving applicant with eight children, totally unprovided for; four of whom she has still to support, but receives a little temporary aid from two elder children.

4.—HENLY, MARY ANN. Age 64. Norwood. Widow of John Creed Henly, a Member of the Society from 1842 to 1880. Died in April, 1881. He was for many years Manager to a Wholesale Drug Firm in London. The widow has to support a daughter in delicate health and a son insane. *Second application.*

5.—POWELL, MARY JANE. Age 65. Sidmouth. Widow of John Powell, a Member of the Society from 1842 to 1880, and a subscriber to the Benevolent Fund. Her late husband was in business for forty years at Shaftesbury. Died in 1880. She is in delicate health.

6.—ROWLANDS, AMELIA CATHERINE. Age 62. Devizes. Widow of the late W. S. Rowlands, who was a Member of the Society from 1853 to 1870. She is in a precarious state of health, suffering from feeble action of the heart, and extreme nervous debility. Has no friends in a position to render her any substantial help. *Third application.*

7.—SUTTERBY, CATHARINE MARY AMELIA. Age 57. London. Widow of J. N. Sutterby, a Member of the Society from 1841 to 1882, and a subscriber to the Benevolent Fund from 1874 to 1882. Applicant's late husband was in business at Long Sutton for twenty-eight years. Died suddenly in May last, leaving the widow without means.

8.—TAYLOR, HENRY. London. Age 69. A Member of the Society from 1842 to 1853. Applicant was in business on his own account at London and Godalming about eighteen years. Has a wife, age 42, and two children, under 14, dependent upon him. His only means of obtaining a living is by acting as locum tenens and occasional assistance from a son in Australia.

9.—WAVELL, JOHN. Age 65. Ryde. A Member of the Society from 1853 to 1878, and a subscriber to the Benevolent Fund. Also Local Secretary for some years. Was in business at Ryde for thirty years. Is now paralysed.

BENEVOLENT FUND.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

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Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

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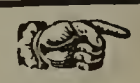

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The only one made to sell at a low price. The lower part is of glass only.
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Oxford shape	,, 8/6
Boxwood	,, 8/6, 12/0
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Graduated Tumbler in leather case, per dozen, 9/0.
The Cheapest Article in the Trade.

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(2 dozen in a box.)

Poor Man's, spread with Olibanum	Per dozen, 2/0
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SPREAD PLASTERS (Balsamic or Roborons).

		1*d.*	2*d.*	3*d.*	4*d.*	6*d.*	8*d.*
Heart Shape.	Per dozen	0/8	1/4	2/0	2/8	4/0	6/0
Long ,,	,,	0/8	1/4	2/0	2/8	4/0	6/0
Saddle ,,	,,	—	—	—	—	4/0	6/0
Oval ,,	,,	—	—	—	2/8	4/0	—
Breast (Plumbi)	,,	—	—	—	2/8	4/0	—

Poor Man's, on Paper.. .. .. Per gross, 9/0; cloth, 16/0

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Packed two dozen in a box. Size, 5x7½ inches.

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Aconite	per gross,	3	0	0
Arnica	"	2	8	0
Belladonna	"	2	14	0
Capsicum	"	2	0	0
Iron	"	2	8	0
Opium	"	3	12	0
Poor Man's	"	2	8	0
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Porous or Plain Spread, size, 7 in. wide by 1 yard long.

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Aconite and Belladonna	per dozen,	1	16	0
Belladonna	"	1	7	6
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Capsicum	"	1	7	6
Mercurial	"	1	16	0
Opium	"	1	16	0
Pitch Burgundy	"	1	7	6
Roborans	"	1	7	6
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May also be had in Spools, ½, 1, 2 and 3 inches wide.

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Also, on Tracing Cloth and Muslin.

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Tins, containing 10 leaves	per dozen,	10s.	0d.
Envelopes, containing 6 leaves	"	6	0
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Yard Rolls, 6 inches wide	"	10	0
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QUALITY IS OF FIRST IMPORTANCE

THE PHARMACOPŒIA AS A STUDENT'S MANUAL.*

BY PROFESSOR ATTFIELD, F.R.S.

A pharmacopœia, the great medicine book of a country, is not primarily written for pupils. And yet it is the volume which, perhaps before all others, should be placed in the hands of the medical or pharmaceutical student. For it contains a description of the armoury with which as physician or pharmacist he will presently have to carry on, very literally, the battle of life; the fight against ill-health, disease, and decay. A glance through it in his earliest days of pupilage will reveal, even to his still untrained eye, what are unmistakably weapons of offence and of defence; and his general education and his common sense will rightly suggest that with the use of every kind of instrument there mentioned he will some day have to be familiar. Nay, he will rightly conclude that not only with the use, but with the construction, of each weapon he must sooner or later become acquainted. He will, moreover, reflect that before he can be a skilled warrior, or even a trusted armour-bearer, he must largely increase his more fundamental knowledge, both of matter and of force, and must more highly cultivate his powers of thought and of reason. Afterwards, during the period that he is extending that knowledge and maturing those powers, he will now and again glance into the collection, until, having acquired a mastery over underlying principles, he regularly frequents the armoury, and, intelligently, enjoyably and with ease, learns everything connected with the fabrication and properties and uses of the instruments there brought together.

Leaving metaphor, a pharmacopœia, British or foreign, is an index of work, a book which points out or makes manifest the pharmaceutical work which it is our duty and our pleasure to perform. To the student it is an index of educational scientific work, to the principal an index of practical art work, in pharmacy. For pharmacy includes both science and art, and may be regarded not as a distinct and separate art or science, so much as a mosaic of arts and sciences, of the chief details of which the Pharmacopœia is an index or catalogue. Thus, the book embraces physics and mechanics without being a physical or mechanical treatise; it includes chemistry and botany without being a handbook of either; it contains a list of materials for medical prescriptions without being a volume on that combination of subjects known as materia medica; and if, outside physics, mechanics, chemistry, botany and materia medica, there remain anything that can be termed pharmacy, the Pharmacopœia embodies it, yet the book is not a manual of pharmacy. That is to say, it is not a student's manual of pharmacy, whatever it may be for the medical or pharmaceutical practitioner. For either of these latter workers a pharmacopœia is perhaps such a text-book. At all events it is primarily written for them, not for students as students. Indeed, the preface of the British Pharmacopœia — the Pharmacopœia with which we are just now more immediately concerned —states that it is "a book containing a list of medicines and compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed. . . . It is intended to afford to the members of the medical profession and those engaged in the preparation of medicines throughout the British Empire one uniform standard and guide, whereby the nature and composition of substances to be used in medicine may be ascertained and determined." One of its objects is "the definition of substances which the physician prescribes, and which are required to be kept at one uniform standard of strength and composition." Again, "pains have been taken to make the descriptions of all the substances referred to in the work sufficiently comprehensive and minute to afford a clear indication of what the medicines of the Pharmacopœia are intended to be, and to enable those who are engaged in their administration to determine the identity and test the purity of such as are met with in commerce." Here is no direct word for the pupil as a pupil.

But the student of pharmacy, medical or pharmaceutical, hopes and intends, at some future time, himself to administer or to manufacture medicines and to maintain them of standard strength; hence, before he has finished reading even the preface of the work, he will appreciate the thoughtfulness of those who placed the Pharmacopœia in his 'prentice hands and will lose no opportunity of studying a book which promises to give him such an insight into and such a grasp of his future career.

Here a question will arise in some minds as to whether or not a pharmacopœia could perhaps be made, what admittedly it is not now, namely, a systematic educational work for students. Such a course is probably quite impracticable. For to carry it out thoroughly would involve the conversion of a single handy book into a work of many volumes, amongst whose multitudinous pages all that relates to the practical manufacture or administration of medicines would be dwarfed if not hidden altogether. To adopt the plan partially and pithily would involve the giving of high official sanction to that too rapid and superficial acquirement of information still, alas, too common, though now everywhere deprecated; that is, would encourage, not the digestion, assimilation and retention of knowledge by the student himself, but, his mere temporary possession and employment of knowledge which, falsely labelled as his own, has, in reality, been collected and elaborated by others. Some pharmacopœias are more, some less, educationally valuable than the British; but, speaking generally, we may say that a pharmacopœia is not, and probably never will be, what is ordinarily understood by an educational work. Some of its peculiarities may perhaps be retained because their educational value adds weight to other reasons for their retention, but a systematic student's manual it can never become.

How, then, should a medical, and more especially a pharmaceutical, pupil deal with this book, one clearly not designed as a student's book, yet one with which a student must very early make close acquaintance and sooner or later become thoroughly familiar? How should he study the book, not the arts and sciences to which it is the index or guide, but the book as a book? For in the case of a pharmacopœia the student might, I think, with much advantage, at all events in the present stage of progress in British pharmaceutical education, adopt this mode of dealing with a volume. It is an unusual mode, no doubt. Commonly an educa-

* Presidential Address delivered at the opening meeting of the School of Pharmacy Students' Association, 1882-3.

tional work is read for the knowledge it will afford. A man pores over a manual of physics not to consider its construction but to study physics. He brings brain power to bear on a botanical book for the sake of its botany. He cares little for the plan or construction of a chemical treatise, but a great deal for the construction of its formulæ, theories and processes. Occasionally, however, a book is studied from the point of view of construction or method of arrangement. Thus, to write a critique a man must study a work from that point of view. And perhaps a young man intent on mastering his Pharmacopœia might well adopt the attitude or standpoint of the critic, not with the object of the critic, that of criticising, nor with the hope of studying with the ability possessed by a practised critic, but with the endeavour to employ the mode or manner of studying followed by a critic. For the time being his question regarding the Pharmacopœia will then be, not what is contained therein, but how is it contained. Into what classes or categories may its rich stores of facts be divided.

From this aspect, then, the young pupil or apprentice first examines the Pharmacopœia. He has scarcely finished reading the prefatory pages, has not glanced over more than half a dozen leaves, before he finds that the articles or sections have to do with vegetable substances, with mineral substances and with less definite mixtures or compounds. One of several courses he might then follow would be to purchase three small note-books and set to work to produce, as far as his own unaided ability might carry him, a manuscript catalogue of each of the three classes just mentioned; in fact, compile a kind of *catalogue raisonné* or subject-catalogue from one which is arranged alphabetically. Let him but do this earnestly and with reasonable intelligence and he may rest assured he will have laid a trustworthy foundation, at all events, of a knowledge of chemistry, botany and pharmacy.

What the pupil may next do, as regards the Pharmacopœia, will depend on his tastes, on his general mental character as formed by nature, on home-training and school associations, and on the variety of good advice with which he may have been favoured. Perhaps his inclinations will lead him further to divide and subdivide. Perhaps he will still more wisely prefer to spend occasional hours for a month or two with more truly educational books on chemistry, botany, etc., and then again proceed with his analysis of the Pharmacopœia. Sooner or later, however, the pharmaceutical apprentice who means to be something more than a mere mechanical mixer of drugs, and not a mere hand-to-mouth vendor of drugs and sundries, will have himself prepared the following manuscripts:—First, a well arranged list of the chemical substances mentioned in the Pharmacopœia, an improved form of his first rough catalogue of mineral preparations. Secondly, a similarly well arranged list of the vegetable products, with, perhaps, added columns showing the botanical name of the plant, its common name, the part employed, the country whence obtained, etc. Thirdly, a complete list of the compounded drugs or mixtures, with added columns showing the names of their chief or more powerful components, and the proportions in which the active agents occur in the respective preparations, etc. The compounds might be subdivided into powders, pills, ointments, etc.

A philological examination, by the student, of the chemical, botanical and other terms in the Pharmacopœia will be found to be both instructive and entertaining. And if he extends his labours, as he probably will, to the generic and specific names of wayside flowers, he will go far towards fitting himself to be a charming companion for a summer ramble, a strong link in the conversational chain encircling the dinner table, and a valued contributor to the tales and tit-bits of a winter's fireside. He will find poetry associated with a daphne, mythology with an atropa, music murmuring in the Latin name of the elder, history with gentian, lobelia and valerian, and geography with carum and colchicum. He will learn how graphic are the names humulus lupulus, crocus, helleborus, oxalis, digitalis, fœniculum, hyoscyamus. And should he not already be strong in classics he will be instructed by such adjectival terms as æstivus, agrarius, aquilina, arvensis, borealis, campestris, ciliaris, collinus, fluviatilis, gracilis, graveolens, hypnoides, lacustris, littoralis, muralis, nemoralis, petræa, pulchella, riparia, sativus, sylvestris, usitatissimum, vernalis, virosus. A search for the derivations of the chemical names of the Pharmacopœia is also an extremely interesting and instructive task.

An examination of the Pharmacopœia from the geographical standpoint will enlarge a pupil's mind as well as give him knowledge valuable in pharmacy. A few pen-and-ink skeleton maps are easily and quickly drawn, on which may be written, by the student himself, in different coloured inks, the habitats of the minerals and plants yielding officially recognized drugs. These habitats he should himself search out from works on materia medica.

There are formulæ and formulæ in a pharmacopœia. Thus in literary construction the following formulæ are alike:—

Take of—

Fine iron wire	1½ ounces.
Iodine	3 ounces.
Distilled water	15 fluid ounces.

Take of—

Mercury	2 ounces.
Confection of roses	3 ounces.
Liquorice root	1 ounce.

But in the latter, the proportions of ingredients are fixed by the authorities who issue the Pharmacopœia; in the former, nature, to whom all such authorities must bow, fixes absolute limits to the proportions of constituents in the product. The one product is a mechanical mixture, the other a chemical mixture; and although a student would scarcely be wise in drawing up lists of the whole of the formulæ for the mechanical mixtures of the Pharmacopœia as compared with those for chemical compounds, he may well select a score or so of each, for in so doing he will be planting seeds of information in his mind which, well nurtured, will mature into knowledge of some of the grandest forces of nature.

A medical pupil might, in addition, convert the alphabetical list of official remedial substances into a therapeutical list;—antacids, cathartics, diuretics, narcotics, stimulants, tonics, etc.

The Latin of the Pharmacopœia and even the arithmetic, including all weights and measures, might claim attention in the cases, of course very few, in which pupils feel they are not quite so strong in those subjects as they could desire.

And now, having broken up the great alpha-

betically arranged catalogue of matters called a pharmacopœia into lists chemical, botanical and pharmaceutical, and, perhaps, lists philological and geographical, the whole forming a manuscript pharmacopœial *catalogue raisonné*, the student will probably find himself nearing the end of his pupilage or apprenticeship. If his career is to be the medical profession, he will soon proceed to a medical school, fortunate if he has had any time to go through such preparatory work. If he is following the calling of a chemist and druggist, he will have completed his reading, so far, and his more or less practical acquaintance with the preparation of confections, decoctions, enemas, extracts, glycerines, infusions, inhalations, juices, liniments, lozenges, mixtures, ointments, pills, plasters, poultices, powders, spirits, suppositories, syrups, tinctures and wines; and will probably soon make such arrangements as will enable him to give some months to the systematic study of chemistry, including much practical chemistry, botany, materia medica and some physics.

This academic course completed, or being within measurable distance of completion, he will doubtless once more return to his Pharmacopœia. In a period of time the shortness of which will astonish him he will have gone through it with ease and with pleasure, adding to his memoranda those explanations of processes and of tests which his chemistry has revealed and those botanical facts which his study of the natural orders of plants has unveiled. Then according to the extent of his knowledge of principles and his personal ability, he will find himself more or less its master. In studying the book as a book, and in regarding it as an index of educational and practical work, he will have acquired a sound knowledge of those branches of art and science which together form pharmacy, and will have gone through an invaluable course of mental discipline.

A word of caution. No student will truly help his friend by lending him his manuscript notes *to copy*. What I have many times said privately, I now say publicly, namely that the value of such a summary lies in its being the result of a student's own reading, own learning, own work, own training. A summary, good enough in itself, but made by somebody else may, no doubt, be committed to memory, but the knowledge it affords will be superficial and ephemeral; it will not train the powers of thought and reason, and will do harm to the mind and the morals.

A word of encouragement. If this short address should meet the eye of any pupil in pharmacy who thinks that the calling will not pay for such effort as is here shadowed forth, let him be confirmed in his idea. The effort would never repay *him*. Let him quit the calling. He has already lost enough time and money in following it; he will lose more if he remain. To the pupil whose heart is in his work, and who believes that such endeavours will bring a commensurate reward, to him due reward will come. Future success in pharmacy will lie with those best educated.

In conclusion, I will only add that the most accomplished pharmacist owes most to the Pharmacopœia, and considers himself bound according to his opportunities to do his best to maintain its value. A true student of the Pharmacopœia, he never ceases to be its student. But his attitude towards it of unquestioning loyalty ever merges into one of good and intelligent scepticism, an attitude which provokes sound experimental research and results in improved processes and products.

CONVALLAMARIN,*

THE ACTIVE PRINCIPLE OF THE LILY OF THE VALLEY.

BY C. TANRET.

At a time when the attention of the medical public has just been called to the lily of the valley (*Convallaria majalis*), I have thought it would not be without interest, to complete, from a pharmacological point of view, the communications of Messrs. Sée and Langlebert.†

Those authors have attempted to ascertain which is the most active part of the plant, but without, in my opinion, arriving at any very clear conclusion. In fact, the roots did not give the results sought for; on the other hand the extract of the flowers exercised a very energetic action upon animals, but produced much less intense effects upon man, while an infusion of five or six grams of flowers remained without effect. The leaves showed so little activity that an extract from them required to be given in a dose three times larger than that of the extracts from other parts of the plant. In short, the best results were obtained with aqueous extracts prepared from the flowers and stems, with an addition of one-third of their weight of roots and leaves.

It will be remarked, first, that the time of flowering is not generally that which is recommended as the best for the collection of leaves and roots, the too aqueous juices of which have not yet been sufficiently elaborated. It follows, therefore, that the results obtained with the lily of the valley might vary when a plant collected in a more advanced stage is employed, a serious consideration in dealing with a rather energetic medicine. When it is added that the extracts alter, more or less profoundly, during their evaporation, it will be seen that in order to reckon upon the action of the lily of the valley, it will be necessary to look, not to the extract, but to the active principle.

This active principle has been known for many years. Walz, in 1858, announced that the lily of the valley contained two glucosides, which he named "convallarin" and "convallamarin." In 1867, Marmé made some physiological experiments with these two bodies, and published his researches under the title, "Ueber Convallamarin, ein neues Herzgift."‡ With convallarin, in doses of 3 to 4 grains, he obtained only a purgative effect; but he found that convallamarin acted principally upon the heart, and in a very small dose when injected into the circulatory system: 7 to 10 milligrams for dogs weighing 7 to 14 kilograms; 3 to 8 milligrams for cats of 2 to 3 kilograms; 2 to 3 milligrams for rabbits of 1 to 1·2 kilograms, etc. He also determined the toxic doses to be a crural injection of 15 to 30 milligrams for dogs, 5 to 8 milligrams for rabbits, etc. Death followed usually a few minutes after the administration of these doses; happening by stoppage of the heart and nearly always accompanied by very intense clonic convulsions. He adds that there is no doubt

* *Journal de Pharmacie*, [6], iii., 355; from the *Bull. Gén. de Thérapeutique.*

† See before, pp. 143, 144.

‡ *Nachrichten von der k. Gesellschaft der Wissens.*, Göttingen, 1867, p. 160.

that convallamarin is a heart poison, and that its physiological action approaches qualitatively and quantitatively that of digitalin, helleborin, the upas principles, etc.

Whilst convallarin is soluble in alcohol, but insoluble in water, convallamarin dissolves in water in all proportions, and is very soluble in ordinary alcohol and methylic alcohol. Convallamarin is insoluble in ether, chloroform and amylic alcohol, and is uncrystallizable. I have observed that it rotates the plane of polarization of light strongly to the left, and I have found its rotatory power in alcoholic solution to be $\alpha_D = -55°$. Pure convallamarin does not reduce Fehling's liquor until it has been boiled with dilute acid, when, according to Walz, it splits up into glucose and convallamaretin. Sulphuric acid dissolves it with a brown colour; but if it be treated with this reagent after having been moistened [? with water], a beautiful violet colour is developed which disappears upon the addition of water. Its taste is bitter, followed by a peculiar after-taste.

As the solvents of this glucoside are the same as those of the accompanying reduced sugar, it did not appear to me possible to obtain pure convallamarin,—not reducing cupric solution,—by the action alone of neutral liquids employed successively upon the plant or its extract. The process of Walz gives a satisfactory product, but as it is long and specially inconvenient, I have modified it in the following manner.

An alcoholic tincture made from the whole plant is precipitated with subacetate of lead and filtered, excess of lead is removed with dilute sulphuric acid, avoiding the use of more than is necessary, and after neutralizing, the tincture is distilled, the last portion of alcohol being driven off in the open air; then the cooled and filtered liquor is treated with tannin, care being taken to keep the liquid neutral by sparing additions of a dilute solution of carbonate of soda. A compound of tannin and convallamarin is precipitated, which, after washing, is dissolved in 60° alcohol, the solution decolorized with charcoal, decomposed with zinc oxide, filtered and evaporated to dryness. In this way convallamarin is obtained nearly white and having the appearance of ordinary digitalin. To free it from the salts that are sometimes carried down by the tannin precipitate it is a good plan to redissolve it in 90° alcohol, filter and then evaporate.

This treatment, applied to the lily of the valley collected in the first days of August in the present year, produced a yield of two grams of convallamarin per kilogram of the fresh plant.

With this process, the preparation of convallamarin will not present any serious difficulties; and if the lily of the valley should remain in the medical armamentarium, its active principle should be substituted for the plant by those who wish to protect themselves from the inconveniences presented by so unequal a distribution of convallamarin in the various parts, its variability according to the time of collection and its alteration in the extracts.

In order to verify this latter point I made the following experiment, based upon the loss of rotatory power which solutions of convallamarin undergo when the glucoside decomposes.

A pound of lily of the valley being taken, of which the strength in convallamarin was known, I commenced by estimating its acidity, which I represented in oxalic acid; then I dissolved in 100 grams of water corresponding quantities of convallamarin and acid. This solution was evaporated in a water-bath to the consistence of an extract, then redissolved in water and examined polarimetrically. The rotatory power had diminished one-half;* one-half, therefore, of the active principle had been decomposed and was no longer present as such in the extract, which, however, had been prepared under the most favourable conditions, the quantity of liquid to evaporate having been very small.

It remains only to refer to an alkaloid which M. Stanislas Martin has stated that he found in the fresh flowers of the lily of the valley and which he named "maialine."† In any case this body would have nothing to do with the activity of the rest of the plant, for I have not been able to find it in the leaves, stems or roots.

ELECTRIC LIGHTING AND THE TRANSMISSION OF FORCE BY ELECTRICITY.‡

Amongst the practical questions that now chiefly occupy public attention are those of electric lighting, and of the transmission of force by electricity. These together form a subject which has occupied my attention and that of my brothers for a great number of years, and upon which I may consequently be expected to dwell on the present occasion, considering that at Southampton I could deal only with some purely scientific considerations involved in this important subject. I need hardly remind you that electric lighting, viewed as a physical experiment, has been known to us since the early part of the present century, and that many attempts have, from time to time, been made to promote its application. Two principal difficulties have stood in the way of its practical introduction, viz., the great cost of producing an electric current so long as chemical means had to be resorted to, and the mechanical difficulty of constructing electric lamps capable of sustaining, with steadiness, prolonged effects. The dynamo-machine, which enables us to convert mechanical into electrical force, purely and simply, has very effectually disposed of the former difficulty, inasmuch as a properly conceived and well-constructed machine of this character converts more than 90 per cent. of the mechanical force imparted to it into electricity, 90 per cent. again of which may be re-converted into mechanical force at a moderate distance. The margin of loss, therefore, does not exceed 20 per cent., excluding purely mechanical losses, and this is quite capable of being further reduced to some extent by improved modes of construction; but it results from these figures that no great step in advance can be looked for in this direction. The dynamo-machine presents the great advantage of simplicity over steam or other power-transmitting engines; it has but one working part, namely, a shaft which, revolving in a pair of bearings, carries a coil or coils of wire admitting of perfect balancing. Frictional resistance is thus reduced to an absolute minimum, and no allowance has to be made for loss by condensation, or badly fitting pistons, stuffing boxes, or valves, or for the jerking action due to oscillating weights. The materials composing the machine, namely, soft iron and copper wire, undergo no deterioration or change by continuous working, and the depreciation of value is therefore a minimum, except where currents of exceptionally high potential are used, which appear to render the copper wire brittle.

* I have ascertained that the glucoside derived from the breaking up of convallamarin is without action upon polarized light.

† *Union Pharmaceutique*, 1865.

‡ From a Presidential Address delivered by Dr. C. W. Siemens, F.R.S., before the Society of Arts, November 15.

The essential points to be attended to in the construction of the dynamo-machine, are the prevention of induced currents in the iron, and the placing of the wire in such position as to make the whole of it effective for the production of outward current. These principles, which have been clearly established by the labours of comparatively few workers in applied science, admit of being carried out in an almost infinite variety of constructive forms, for each of which may be claimed some real or imaginary merits regarding questions of convenience or cost of production.

For many years after the principles involved in the construction of dynamo-machines had been made known, little general interest was manifested in their favour, and few were the forms of construction offered for public use. The essential features involved in the dynamo-machine, the Siemens' armature (1856), the Pacinotti ring (1861), and the self-exciting principle (1867), were published by their authors for the pure scientific interest attached to them, without being made subject matter of letters patent, which circumstance appears to have had the contrary effect of what might have been expected, in that it has retarded the introduction of this class of electrical machine, because no person or firm had a sufficient commercial interest to undertake the large expenditure which must necessarily be incurred in reducing a first conception into a practical shape. Great credit is due to Monsieur Gramme for taking the initiative in the practical introduction of dynamo-machines embodying those principles, but when five years ago I ventured to predict for the dynamo-electric current a great practical future, as a means of transmitting power to a distance, those views were still looked upon as more or less chimerical. A few striking examples of what could be practically effected by the dynamo-electric current, such as the illumination of the Place de l'Opéra, Paris, the occasional exhibition of powerful arc lights, and their adoption for military and lighthouse purposes, but especially the gradual accomplishment of the much desired lamp by incandescence in vacuum, gave rise to a somewhat sudden reversion of public feeling; and you may remember the scare at the Stock Exchange affecting the value of gas shares, which ensued in 1878, when the accomplishment of the sub-division of the electric light by incandescent wire was first announced, somewhat prematurely, through the Atlantic cable.

From this time forward electric lighting has been attracting more and more public attention, until the brilliant displays at the exhibition of Paris, and at the Crystal Palace last year, served to excite public interest to an extraordinary degree. New companies for the purpose of introducing electric light and power have been announced almost daily, whose claims to public attention as investments were based in some cases upon only very slight modifications of well-known forms of dynamo-machines, of arc regulators, or of incandescent carbon lights, the merits of which rested rather upon anticipations than upon any scientific or practical proof. These arrangements were supposed to be of such superlative merit that gas and other illuminants must soon be matters simply of history, and hence arose great speculative excitement. It should be born in mind, however, that any great technical advance is necessarily the work of time and serious labour, and that, when accomplished, it is generally found that so far from injuring existing industries, it calls additional ones into existence, to supply new demands, and thus gives rise to an increase in the sum total of our resources. It is, therefore, reasonable to expect that, side by side with the introduction of the new illuminant, gas lighting will go on improving and extending, although the advantage of electric light for many applications, such as the lighting of public halls and warehouses, of our drawing-rooms and dining-rooms, our passenger steamers, our docks and harbours, are so evident, that its advent may be looked upon as a matter of certainty.

Our Legislature has not been slow in recognizing the importance of the new illuminant. In 1879, a Select Committee in the House of Commons instituted a careful inquiry into its nature and probable cost, with a view to legislation, and the conclusions at which they arrived were, I consider, the best that could have been laid down. They advised that applications should be encouraged tentatively by the granting of permissive Bills, and this policy has given rise to the Electric Lighting Bill, 1882, promoted by Mr. Chamberlain, the President of the Board of Trade, regarding which much controversy has arisen. It could, indeed, hardly be expected that any act of legislation upon this subject could give universal satisfaction, because while there are many believers in gas who would gladly oppose any measure likely to favour the progress of the rival illuminant, and others who wish to see it monopolized, either by local authorities, or by large financial corporations, there are others again who would throw the doors open so wide as to enable almost all comers to interfere with the public thoroughfares, for the establishment of conducting wires, without let or hindrance.

The law as now established takes, I consider, a medium course between these diverging opinions, and, if properly interpreted, will protect, I believe, all legitimate interests, without impeding the healthy growth of establishments for the distribution of electric energy for lighting and for the transmission of power. Any firm or lighting company may, by application to the local authorities, obtain leave to place electric conductors below public thoroughfares, subject to such conditions as may be mutually agreed upon, the terms of such licence being limited to seven years; or an application may be made to the Board of Trade for a provisional order to the same effect, which, when sanctioned by Parliament, secures a right of occupation for twenty-one years. The licence offers the advantage of cheapness, and may be regarded as a purely tentative measure, to enable the firm or company to prove the value of their plant. If this is fairly established, the licence would in all probability be affirmed, either by an engagement for its prolongation from time to time, or by a provisional order which would, in that case, be obtained by joint application of the contractor and the local authority. At the time of expiration of the provisional order, a pre-emption of purchase is accorded to the local authority, against which it has been objected with much force by so competent an authority as Sir Frederick Bramwell, that the conditions of purchase laid down are not such as fairly to remunerate the contracting companies for their expenditure and risk, and that the power of purchase would inevitably induce the parochial bodies to become mere trading associations. But while admitting the undesirability of such a consummation, I cannot help thinking that it was necessary to put some term to contracts entered into with speculative bodies at a time when the true value of electric energy, and the best conditions under which it should be applied, are still very imperfectly understood. The supply of electric energy, particularly in its application to transmission of power, is a matter simply of commercial demand and supply, which need not partake of the character of a large monopoly similar to gas and water supply, and which may therefore be safely left in the hand of individuals, or of local associations, subject to a certain control for the protection of public interests. At the termination of the period of the provisional order, the contract may be renewed upon such terms and conditions as may at that time appear just and reasonable to Parliament, under whose authority the Board of Trade will be empowered to effect such renewal.

Complaints appear almost daily in the public papers to the effect that townships refuse their assent to applications by electric light companies for provisional orders; but it may be surmised that many of these applications are of a more or less speculative character,

the object being to secure monopolies for eventual use or sale, under which circumstances the authorities are clearly justified in withholding their assent; and no licences or provisional orders should, indeed, be granted, I consider, unless the applicants can give assurance of being able and willing to carry out the work within a reasonable time. But there are technical questions involved which are not yet sufficiently well understood to admit of immediate operations upon a large scale.

Attention has been very properly called to the great divergence in the opinions expressed by scientific men regarding the area that each lighting district should comprise, the capital required to light such an area, and the amount of electric tension that should be allowed in the conductors. In the case of gas supply, the works are necessarily situated in the outskirts of the town, on account of the nuisance this manufacture occasions to the immediate neighbourhood; and, therefore, gas supply must range over a large area. It would be possible, no doubt, to deal with electricity on a similar basis, to establish electrical mains in the shape of copper rods of great thickness, with branches diverging from them in all directions; but the question to be considered is, whether such an imitative course is desirable on account either of relative expense or of facility of working. My own opinion, based upon considerable practical experience and thought devoted to the subject, is decidedly adverse to such a plan. In my evidence before the Parliamentary Committee, I limited the desirable area of an electric district in densely populated towns to a quarter of a square mile, and estimated the cost of the necessary establishment of engines, dynamo-machines, and conductors, at £100,000, while other witnesses held that areas from one to four square miles could be worked advantageously from one centre, and at a cost not exceeding materially the figure I had given. These discrepancies do not necessarily imply wide differences in the estimated cost of each machine or electric light, inasmuch as such estimates are necessarily based upon various assumptions regarding the number of houses and of public buildings comprised in such a district, and the amount of light to be apportioned to each, but I still maintain my preference for small districts.

By way of illustration, let us take the parish of St James's, near at hand, a district not more densely populated that other equal areas within the metropolis, although comprising, perhaps, a greater number of public buildings. Its population, according to the preliminary report of the census taken on the 4th of April, 1881, was 29,865, it contains 3018 inhabited houses, and its area is 784,000 square yards, or slightly above a quarter of a square mile.

To light a comfortable house of moderate dimensions in all its parts, to the exclusion of gas, oil, or candles, would require about 100 incandescent lights of from 15- to 18-candle power each, that being, for instance, the number of Swan lights employed by Sir William Thomson in lighting his house at Glasgow University. Eleven-horse power would be required to excite this number of incandescent lights, and at this rate the parish of St. James's would require $3018 \times 11 = 33{,}200$ horse-power to work it. It may be fairly objected, however, that there are many houses in the parish much below the standard here referred to, but on the other hand, there are six hundred of them with shops on the ground floor, involving larger requirements. Nor does this estimate provide for the large consumption of electric energy that would take place in lighting the eleven churches, eighteen club-houses, nine concert halls, three theatres, besides numerous hotels, restaurants and lecture halls. A theatre of moderate dimensions, such as the Savoy Theatre, has been proved by experience to require 1200 incandescent lights, representing an expenditure of 133 horse-power; and about one-half that power would have to be set aside for each of the other public buildings here mentioned, constituting an aggregate of 2926 horse-power; nor does this general estimate comprise street lighting, and to light the six and a half miles of principal streets of the parish with electric light would require, per mile, thirty-five arc lights of 350 candle-power each or a total of 227 lights. This, taken at the rate of 0·8 horse-power per light, represents a further requirement of 182 horse-power, making a total of 3108 horse-power, for purposes independent of house lighting, being equivalent to 1 horse-power per inhabited house, and bringing the total requirements up to 109 lights = 12 horse-power per house.

I do not, however, agree with those who expect that gas lighting will be entirely superseded, but have, on the contrary, always maintained that the electric light, while possessing great and peculiar advantages for lighting our principal rooms, halls, warehouses, etc., owing to its brilliancy, and more particularly to its non-interference with the healthful condition of the atmosphere, will leave ample room for the developement of the former, which is susceptible of great improvement, and is likely to hold its own for the ordinary lighting up of our streets and dwellings.

Assuming, therefore, that the bulk of domestic lighting remains to the gas companies, and that the electric light is introduced into private houses, only, at the rate of, say 12 incandescent lights per house, the parish of St. James's would have to be provided with electric energy sufficient to work $(9+12)\ 3018 = 63{,}378$ lights $= 7042$ horse-power effective; this is equal to about one-fourth the total lighting power required, taking into account that the total number of lights that have to be provided for a house are not all used at one and the same time. No allowance is made in this estimate for the transmission of power, which, in course of time, will form a very large application of electric energy; but considering that power will be required mostly in the day time, when light is not needed, a material increase in plant will not be necessary for that purpose.

In order to minimize the length and thickness of the electric conductor, it would be important to establish the source of power, as nearly as may be, in the centre of the parish, and the position that suggests itself to my mind is that of Golden Square. If the unoccupied area of this square, representing 2500 square yards, were excavated to a depth of 25 feet, and then arched over so as to re-establish the present ground level, a suitable covered space would be provided for the boilers, engines, and dynamo-machines, without causing obstruction or public annoyance; the only erection above the surface would be the chimney, which, if made monumental in form, might be placed in the centre of the square, and be combined with shafts for ventilating the subterranean chamber, care being taken of course to avoid smoke by insuring perfect combustion of the fuel used. The cost of such a chamber, of engine-power, and of dynamo-machines, capable of converting that power into electric energy, I estimate at £140,000. To this expense would have to be added that of providing and laying the conductors, together with the switches, current regulators, and arrangements for testing the insulation of the wire.

The cost and dimensions of the conductors would depend upon their length, and the electromotive force to to be allowed. The latter would no doubt be limited, by the authorities, to the point at which contact of the two conductors with the human frame would not produce injurious effects, or say to 200 volts, except for street lighting, for which purpose a higher tension is admissible. In considering the proper size of conductor to be used in any given installation, two principal factors have to be taken into account; first, the charge for interest and depreciation on the original cost of a unit length of the conductor; and, secondly, the cost of the electrical energy lost through the resistance of a unit of length. The sum of these two, which may be regarded as the cost of conveyance of electricity, is clearly least, as Sir William Thomson pointed out some time ago, when the two com-

ponents are equal. This, then, is the principle on which the size of a conductor should be determined.

From the experience of large installations, I consider that electricity can, roughly speaking, be produced in London at a cost of about one shilling per 10,000 ampère-volts or watts (746 watts being equal to 1 horse-power) for an hour. Hence, assuming that each set of four incandescent lamps in series (such as Swan's, but for which may be substituted a smaller number of higher resistance and higher luminosity) requires 200 volts electromotive force, and 60 watts for their efficient working, the total current required for 64,000 such lights is 19,200 ampères, and the cost of the electric energy lost by this current in passing through 1-100th of an ohm resistance, is £16 per hour.

The resistance of a copper bar one quarter of a mile in length, and 1 square inch in section, is very nearly 1-100th of an ohm, and the weight is about $2\frac{1}{3}$ tons. Assuming, then, the price of insulated copper conductor at £90 per ton, and the rate of interest and depreciation at $7\frac{1}{2}$ per cent., the charge per hour of the above conductor, when used eight hours per day, is $1\frac{1}{2}d$. Hence, following the principle I have stated above, the proper size of conductor to use for an installation of the magnitude I have supposed would be one of 48-29 inches section, or a round rod 8 inches diameter.

If the mean distance of the lamps from the station be assumed at 350 yards, the weight of copper used in the complete system of conductors would be nearly 168 tons, and its cost £15,120. To this must be added the cost of iron pipes, for carrying the conductors underground, and of testing boxes, and labour in placing them. Four pipes of 10 inch diameter each, would have to proceed in different directions from the central station, each containing sixteen separate conductors of 1 inch diameter, and separately insulated, each of them supplying a sub-district of 1000 lights. The total cost of establishing these conductors may be taken at £37,000, which brings the total expenditure for central station and leads to £177,000. I assume the conductors to be placed underground, as I consider it quite inadmissible, both as regards permanency and public safety and convenience, to place them above ground, within the precincts of towns. With this expenditure, the parish of St. James's would be supplied with the electric light to the extent of about 25 per cent. of the total illuminating power required. To provide a larger percentage of electric energy would increase the cost of establishment proportionately; and that of conductors, nearly in the square ratio of the increase of the district, unless the loss of energy by resistance is allowed to augment instead.

It may surprise uninitiated persons to be told that to supply a single parish with electric energy necessitates copper conductors of a collective area equal to a rod of 8 inches in diameter; and how, it may be asked, will it be possible under such conditions to transmit the energy of waterfalls to a distance of twenty or thirty miles, as has been suggested? It must indeed be admitted that the transmission of electric energy of such potential (200 volts) as is admissible in private dwellings would involve conductors of impracticable dimensions, and in order to transmit electrical energy to such distances, it is necessary to resort in the first place to an electric current of high tension. By increasing the tension from 200 to 1200 volts the conductors may be reduced to one-sixth their area, and if we are content to lose a larger proportion of the energy obtained cheaply from a waterfall, we may effect a still greater reduction. A current of such high potential could not be introduced into houses for lighting purposes, but it could be passed through the coils of a secondary dynamo-machine, to give motion to another primary machine, producing currents of low potential to be distributed for general consumption. Or secondary batteries may be used to effect the conversion of currents of high into those of low potential, whichever means may be found the cheaper in first cost, in maintenance, and most economical of energy. It may be advisable to have several such relays of energy for great distances, the result of which would be a reduction of the size and cost of conductor at the expense of final effect, and the policy of the electrical engineer will, in such cases, have to be governed by the relative cost of the conductor, and of the power at its original source. If secondary batteries should become more permanent in their action than they are at the present time, they may be largely resorted to by consumers, to receive a charge of electrical energy during the day time, or the small hours of the night, when the central engine would otherwise be unemployed, and the advantage of resorting to these means will depend upon the relative first cost, and cost of working the secondary battery and the engine respectively. These questions are, however, outside the range of our present consideration.

The large aggregate of dwellings comprising the metropolis of London covers about seventy square miles, thirty of which may be taken to consist of parks, squares, and sparely inhabited areas, which are not to be considered for our present purpose. The remaining forty square miles could be divided into say one hundred and forty districts, slightly exceeding a quarter of a square mile on the average, but containing each fully three thousand houses, and a population similar to that of St. James's.

Assuming twenty of these districts to rank with the parish of St. James's (after deducting the six hundred shops which I did not include in my estimate) as central districts, sixty to be residential districts, and sixty to be comparatively poor neighbourhoods, and estimating the illuminating power required for these three classes in the proportion of 1 to $\frac{2}{3}$ to $\frac{1}{3}$, we should find that the total capital expenditure for supplying the metropolis with electric energy to the extent of 25 per cent. of the total lighting requirements would be—

$$20 \times 177{,}000 = £3{,}540{,}000$$
$$60 \times \tfrac{2}{3} \times 177{,}000 = £7{,}080{,}000$$
$$60 \times \tfrac{1}{3} \times 177{,}000 = £3{,}540{,}000$$
$$£14{,}160{,}000$$

or say £14,000,000, without including lamps and internal fittings, and making an average capital expenditure of £100,000 per district.

To extend the same system over the towns of Great Britain, and Ireland would absorb a capital exceeding certainly £64,000,000, to which must be added £16,000,000 for lamps and internal fittings, making a total capital expenditure of £80,000,000. Some of us may live to see this capital realized, but to find such an amount of capital, and, what is more important, to find the manufacturing appliances to produce work representing this value of machinery and wire, must necessarily be the result of many years of technical development. If, therefore, we see that electric companies apply for provisional orders to supply electric energy, not only for every town throughout the country, but also for the colonies, and for foreign parts, we are forced to the conclusion that their ambition is somewhat in excess of their power of performance; and that no provisional order should be granted except conditionally on the work being executed within a reasonable time, as without such a provision the powers granted may have the effect of retarding instead of advancing electric lighting, and of providing an undue encouragement to purely speculative operations.

The extension of a district beyond the quarter of a square mile limit would necessitate an establishment of unwieldy dimensions, and the total cost of electric conductors per unit area would be materially increased; but independently of the consideration of cost, great public inconvenience would arise in consequence of the number and dimensions of the electric conductors, which could no longer be accommodated in narrow channels placed below the kerb stones, but would necessitate the construction of costly subways—veritable *cava electrica*.

The amount of the working charges of an establishment

comprising the parish of St. James's would depend on the number of working hours in the day, and on the price of fuel per ton. Assuming the 64,000 lights to incandesce for six hours a day, the price of coal to be 20*s.* a ton, and the consumption 2 lbs. per effective horse-power per hour, the annual charge under this head, taking eight hours' firing, would amount to about £18,300, to which would have to be added for wages, repairs, and sundries, about £6000, for interest with depreciation at 7½ per cent., £13,300, and for general management say £3400, making a total annual charge of £41,000, or at the rate of 12*s.* 9½*d.* per incandescent lamp per annum. To this has to be added the cost of renewal of lamps, which may be taken at 5*s.* per lamp of sixteen candles, lasting 1200 hours, or to 9*s.* per annum, making a total of 21*s.* 9½*d.* per lamp for a year.

In comparing these results with the cost of gas lighting, we shall find that it takes 5 cubic feet of gas, in a good argand burner, to produce the same luminous effect as 1 incandescent light of 16-candle power. In lighting such a burner every day for six hours on the average, we obtain an annual gas consumption of 10,950 cubic feet, the value of which, taken at the rate of 2*s.* 8*d.* per thousand, represents an annual charge of 29*s.*, showing that electric light by incandescence, when carried out on a large scale, is decidedly cheaper than gas lighting at present prices, and with the ordinary gas-burners.

On the other hand, the cost of establishing gas-works and mains of a capacity equal to 64,000 argand burners would involve an expenditure not exceeding £80,000 as compared with £177,000 in the case of electricity; and it is thus shown that although it is more costly to establish a given supply of illuminating power by electricity than gas, the former has the advantage as regards current cost of production.

It would not be safe, however, for the advocates of electric lighting to rely upon these figures as representing a permanent state of things. In calculating the cost of electric light, I have only allowed for depreciation and 5 per cent. interest upon capital expenditure, whereas gas companies are in the habit of dividing large dividends, and can afford to supply gas at a cheaper rate, by taking advantage of recent improvements in manufacturing operations, and of the ever-increasing value of their by-products, including tar, coke, and ammoniacal liquor. Burners have, moreover, been recently devised by which the luminous effect for a given expenditure of gas can be nearly doubled by purely mechanical arrangements, and the brilliancy of the light can be greatly improved.

On the other hand, electric lighting also may certainly be cheapened by resorting, to a greater extent than has been assumed, to arc lighting, which though less agreeable than the incandescent light for domestic purposes, can be produced at less than half the cost, and deserves on that account the preference for street lighting, and for large halls, in combination with incandescent lights. Lamps by incandescence may be produced hereafter at a lower cost, and of a more enduring character.

Considering the increasing public demand for improved illumination, it is not unreasonable to expect that the introduction of the electric light to the full extent here contemplated would go hand in hand with an increasing consumption of gas for illuminating and for heating purposes, and the neck-to-neck competition between the representatives of the two systems of illumination, which is likely to ensue, cannot fail to improve the quality, and to cheapen the supply of both, a competition which the consuming public can afford to watch with complacent self-satisfaction. Electricity must win the day, as the light of luxury; but gas will, at the same time, find an ever-increasing application for the more humble purposes of diffusing light.

In my address to the British Association I dwelt upon the capabilities and prospects of gas, both as an illuminant and as a heating agent, and I do not think that I was over-sanguine in predicting for this combustible a future exceeding all present anticipations.

I also called attention to the advantages of gas as a heating agent, showing that if supplied specially for the purpose, it would become not only the most convenient, but by far the cheapest form of fuel that can be supplied to our towns. Such a general supply of heating separately from illuminating gas, by collecting the two gases into separate holders during the process of distillation, would have the beneficial effects—

1. Of giving to lighting gas a higher illuminating power.
2. Of relieving our towns of their most objectionable traffic—that in coal and ashes.
3. Of effecting the perfect cure of that bugbear of our winter existence—the smoke nuisance.
4. Of largely increasing the production of these valuable by-products, tar, coke, and ammonia, the annual value of which already exceeds by nearly £3,000,000 that of the coal consumed in the gas-works.

The late exhibitions have been beneficial in arousing public interest in favour of smoke abatement, and it is satisfactory to find that many persons, without being compelled to do so, are now introducing perfectly smokeless arrangements for their domestic and kitchen fires.

The Society of Arts, which for more than a hundred years has given its attention to important questions regarding public health, comfort, and instruction, would, in my opinion, be the proper body to examine thoroughly into the question of the supply and economical application of gas and electricity for the purposes of lighting, of power production, and of heating. They would thus pave the way to such legislative reform as may be necessary to facilitate the introduction of a national system.

If I can be instrumental in engaging the interest of the Society in these important questions, especially that of smoke prevention, I shall vacate this chair next year with the pleasing consciousness that my term of office has not been devoid of a practical result.

INFLUENCE OF PEPTONES AND CERTAIN INORGANIC SALTS ON THE DIASTATIC ACTION OF SALIVA.*

BY R. H. CHITTENDEN AND J. S. ELY.

(*Concluded from page* 387.)

First Experiment.

	Wt. Cu in one-tenth. Gram.
Saliva and starch alone	0·0872
Saliva and starch + 0·05 per cent. HCl = 0·025 per cent.	0·0088
Saliva and starch + 0·05 per cent. HCl + 0·012 gram NaCl	0·0132
Saliva and starch + 0·05 per cent. + 0·012 gram Na_2HPO_4	0·0120

Second Experiment.

	Wt. Cu in one-tenth. Gram.
Saliva and starch alone	0·0835
Saliva and starch + 0·05 per cent. HCl = 0·025 per cent.	0·0050
Saliva and starch + 0·05 per cent. HCl + 0·012 gram $CaHPO_4$	0·0079
Saliva and starch + 0·05 per cent. HCl + 0·015 gram $CaHPO_4$	0·0490
Saliva and starch + 0·05 per cent. HCl + 0·024 gram $CaHPO_4$	0·0600

It is thus evident that sodium chloride and phosphate when present to the extent of 0·012 per cent. exercise but a very slight influence on the action of the saliva. Calcium phosphate, however, is seen to decidedly increase the diastatic action, though the amount contained in the

* From the *American Chemical Journal.*

peptones can have but little influence on the formation of sugar. Very striking is the great increase of sugar formed in the presence of 24 milligrams of calcium phosphate. This result is certainly suggestive of a possible utility of the calcium phosphate invariably present in wheat, oats, and carbohydrate matter in general. What may be the exact explanation of the action of the phosphate in such a weak acid solution is of course hypothetical. The salt dissolves, in part at least, in the acid, and is thus probably modified with formation of bodies more favourable to the action of the ferment; it certainly cannot diminish to any extent the strength of the acid.

The influence of the combined inorganic matter of the peptones was now determined by experiment with the ash of No. 1, which contained 1·71 per cent.

	Saliva and starch. Wt. Cu in one-tenth.	+0·05 per cent. HCl. Wt. Cu in one-tenth.	+1 gram peptone. Wt. Cu in one-tenth.	+Ash 1 gram peptone. Wt. Cu in one-tenth.
1.	0·0866 gram	0·0053 gram	0·1058 gram	0·0370 gram
2.	0·0862 „	—	—	0·0123 „

Thus, in the sample containing the largest percentage of ash, and presumably therefore of calcium phosphate, and under the same conditions as this salt appears to work to the best advantage, only a slight increase is noticed in the diastatic action of the saliva. It is therefore evident that while the addition of 50 c.c. 0·05 per cent. hydrochloric acid to an equal volume of saliva and water brings the diastatic action down almost to zero, the addition of 1 gram of peptones to this acid fluid increases the diastatic action of the saliva to above its normal amount. In other words the presence of 1 per cent. of gastric peptones in a salivary mixture containing 0·025 per cent. of acid acts as a stimulant to the diastatic ferment, causing it to act with greatly increased vigour. This fact appears to us to be of prime importance in solving the question as to the possibility of a continued action of the salivary ferment in the stomach. In 1881 one* of us, experimenting with human saliva, found that its diastatic action was increased by the presence of very minute quantities of hydrochloric acid; thus while the quantity of sugar formed by freshly collected saliva was regarded as 100, the quantity formed by saliva of the same collecting in a mixture containing 0·005 per cent. of hydrochloric acid was 110. Increasing the percentage of acid diminishes the diastatic action, until at last, when the fluid contains 0·025 per cent. of hydrochloric acid, the formation of sugar is almost entirely stopped. Again, it was found† on digesting 25 c.c. of human saliva with 50 c.c. of gastric juice containing 0·2 per cent. of hydrochloric acid, at 40° C. for two hours, that the diastatic ferment was entirely destroyed; likewise that simple warming of the saliva with 0·2 per cent. acid at 40° C. for two hours was sufficient to destroy the greater part of the ferment, as was evinced by the low diastatic power of the neutralized fluid. Both of these results have received recent confirmation from the experiments of J. N. Langley‡ on the diastatic ferments of the parotid of rabbits. From his experiments he concludes that the ptyalin is destroyed by 0·2—0·04 per cent. hydrochloric acid in from seven to twenty-four hours at 40° C., and that the presence of 0·014 per cent. of acid is sufficient to destroy all but the merest trace of ferment for five minutes at 39° C. It appears to us, however, that in the case of human saliva at least there may be in the presence of a very dilute acid a simple stopping of the diastatic action without destruction of the ferment; thus, in the presence of 0·025 per cent. of acid there is but little diastatic action, but if that percentage of acid is sufficient to destroy the ferment in such a short time, in what manner does the 1 per cent. of peptones in an acid solution of the same strength cause such an increased formation of sugar? Again, the experiments of Chittenden and Griswold showed that by warming a mixture of starch, saliva, and artificial gastric juice of weak acidity at 40° C. for forty-five minutes, the diastatic action of the saliva was greatly increased; thus, in the digestion of 1 gram of starch + 25 c.c. of water + 50 c.c. of gastric juice, containing 0·5 per cent. hydrochloric acid + 25 c.c. saliva, the amount of sugar formed as compared with the amount formed by the saliva alone was 133 : 100; while, as the present experiments show, the presence of 0·025 per cent. hydrochloric acid alone stops the action almost completely. It therefore seems probable that in the presence of such dilute acids as the above the ferment is simply hindered in its action, the presence of the peptones being sufficient to counteract the retarding influence of the acid. That this view, as to the non-destruction of the ferment is correct, as regards human saliva at least, we think is plainly demonstrated by the following experiment. 75 c.c. of filtered saliva were divided into three equal parts, which were treated as follows:—

1st. 25 c.c. saliva + 25 c.c. 0·05 per cent. HCl warmed at 40° C. for forty-five minutes. Solution then neutralized with Na_2CO_3. One gram of starch made into a paste with 50 c.c. H_2O was then added and the mixture warmed at 40° C. for forty-five minutes. Solution boiled and diluted to 500 c.c. 50 c.c. of this solution reduced 0·0862 gram Cu.

2nd. 25 c.c. saliva + 25 c.c. H_2O + 50 c.c. 0·05 per cent. HCl warmed at 40° C. for forty-five minutes. Solution then neutralized with Na_2CO_3. 1 gram of starch made into a paste with 25 c.c. H_2O was then added and the mixture warmed at 40° C. for forty-five minutes. Solution boiled and diluted to 500 c.c. 50 c.c. of this solution reduced 0·0805 gram Cu.

3rd. 25 c.c. saliva + 75 c.c. H_2O warmed at 40° C. for forty-five minutes. 1 gram of starch made into a paste with 25 c.c. H_2O was then added and the mixture warmed at 40° C. for forty-five minutes. Solution boiled and diluted to 500 c.c. 50 c.c. of this solution reduced 0·0824 gram Cu.

Here it is plainly seen that the ferment has not been in the least affected by the action of 0·025 per cent.* hydrochloric acid at this temperature. In the case of 0·1 or 0·2 per cent. acid the peptones are wholly without influence, since these strengths of acid are capable of destroying the ferment. It is evident that the salivary ferment is ultimately destroyed in the stomach by the gastric juice, but this fact does not necessarily preclude the possibility of a continued action of the saliva in the stomach. There is a growing impression that in the first stage of stomach digestion there is but little or no free acid present; thus Reinhard v. d. Velden† claims, as a result of observation, that for the first three-fourths of

* Chittenden and Griswold, *American Chemical Journal*, iii., 305.

† Chittenden and Griswold, *loc. cit.*

‡ Foster's *Journal of Physiology*, iii., 246.

* It should be mentioned here that the real percentage of acid is somewhat less than 0·025, owing to the slight alkalinity of the saliva. Ordinarily, however, the alkalinity is not so great in a sample of several hundred cubic centimetres as in a small quantity of freshly secreted saliva. That there might be no possible chance of error, 25 c.c. of mixed saliva were carefully neutralized with diluted hydrochloric acid. Then 25 c.c. of 0·05 per cent. HCl were added, making an exactly 0·025 per cent. HCl solution. This mixture was then warmed at 40° C. for forty-five minutes, after which it was exactly neutralized with Na_2CO_3 solution. 1 gram of starch in 50 c.c. H_2O was then added and the whole warmed at 40° C. for forty-five minutes; 50 c.c. or one-tenth of the diluted fluid yielded 0·0882 gram Cu. Thus here, as in the above experiments, it is plainly evident, from the diastatic action of the neutralized saliva, that the ptyalin is not destroyed or even affected by 0·025 per cent. of actual HCl under the above conditions.

† *Zeitschrift f. physiolog. Chem.*, iii., 205.

an hour after eating a hearty meal, human gastric juice fails to contain much if any free acid.

It now seemed desirable to ascertain the rapidity with which starch is converted into sugar by the saliva. 125 c.c. of filtered saliva were thoroughly mixed, and 12 c.c. of this fluid were used in each experiment. The starchy solution was made by boiling 0·5 gram of starch with 40 c.c. of water, and to this solution the 12 c.c. of saliva were added, making approximately 52 c.c. of fluid. The mixtures were kept at a temperature of 40° C. for the specified time, then boiled to destroy the ferment. Each fluid was then diluted to 200 c.c. and the sugar determined as before in 50 c.c. of the mixed and filtered solution. Following are the results:—

Period of digestion.	Wt. Cu in one-fourth.	Total amount of sugar.	Percentage of starch converted into sugar.
1 minute	0·0870 gram	0·4425 gram	39·82 per cent.
5 minutes	0·0963 ,,	0·4898 ,,	44·09 ,,
10 ,,	0·0991 ,,	0·5040 ,,	45·36 ,,
15 ,,	0·1005 ,,	0·5111 ,,	45·99 ,,
30 ,,	0·1040 ,,	0·5286 ,,	47·57 ,,
45 ,,	0·1087 ,,	0·5525 ,,	49·72 ,,
1 hour	0·1109 ,,	0·5637 ,,	50·73 ,,
2 hours	0·1147 ,,	0·5842 ,,	52·57 ,,

This experiment makes it very apparent that by far the greater part of the starch is almost immediately converted into sugar. It seems, therefore, quite possible, especially in view of the action of peptones in a weak acid solution, that in the case of human beings there may be a continuation of salivary digestion in the stomach, provided the contents of the stomach during the first stage of digestion do not contain more than 0·025 per cent. of free acid.

Influence of Peptones in Alkaline Solution.

Previous experiments have demonstrated that the addition of sodium carbonate to saliva has a retarding influence on salivary digestion. It now seemed advisable to study the influence of peptones in the presence of dilute solutions of sodium carbonate, with especial reference to the pancreatic ptyalin, for presumably in the intestinal canal the diastatic ferment there present acts on starch in an alkaline medium. 0·6 per cent., 0·3 per cent., and 0·1 per cent. solutions of sodium carbonate were employed, experiments being tried with both starch and glycogen. One gram of peptones was used in each case, and as this amount was dissolved in 50 c.c. of the dilute alkali, the digestive mixture of 100 c.c. contained approximately one-half the percentage of alkali employed. The following results were obtained:—

1.—With 0·6 per cent. Na_2CO_3 and 1 gram peptones.

	Saliva alone. Wt. Cu in one-tenth.	Saliva+50 c.c. alkali. Wt. Cu in one-tenth.	Saliva, alkali. and peptones. Wt. Cu in one-tenth.
Starch	0·0905 gm.	0·0239 gm.	0·0456 gm.
,,	0·0904 ,,	0·0222 ,,	0·0486 ,,
,,	0·0835 ,,	0·0214 ,,	0·0515 ,,
Glycogen	0·1300 ,,	0·0312 ,,	0·0683 ,,

2.—With 0·3 per cent. Na_2CO_3 and 1 gram peptones.

	Saliva alone. Wt. Cu in one-tenth.	Saliva+50 c.c. alkali. Wt. Cu in one-tenth.	Saliva, alkali, and peptones. Wt. Cu in one-tenth.
Starch	0·0904 gm.	0·0393 gm.	0·0685 gm.
,,	0·0835 ,,	0·0331 ,,	0·0710 ,,
Glycogen	0·1281 ,,	0·0423 ,,	0·1050 ,,

3.—With 0·1 per cent. Na_2CO_3 and 1 gram peptones.

	Saliva alone. Wt. Cu in one-tenth.	Saliva+50 c.c. alkali. Wt. Cu in one-tenth.	Saliva, alkali, and peptones, Wt. Cu in one-tenth.
Glycogen	0·1281 gm.	0·0908 gm.	0·1197 gm.

It becomes evident then from these experiments that in a solution containing either 0·3 per cent. or 0·15 per cent. of sodium carbonate, the presence of the peptones nearly doubles (quite and even more in the case of glycogen) the diastatic action, bringing it up almost to the action of the unaltered saliva. It may be questionable whether these experiments afford proof positive that the peptones stimulate the pancreatic ferment in the conversion of starch into sugar in the intestinal canal, but it is certainly proven that under such conditions as have been described here, the presence of 1 per cent. of peptones in a 0·3 per cent. sodium carbonate solution causes a greatly increased formation of sugar. Thus it seems probable that in the proteid and diastatic pancreatic digestion the formation of peptones, which must go on side by side with the formation of sugar, affords a decided aid to the latter process.

We next endeavoured to ascertain whether the salts already experimented with have any influence on diastatic action in alkaline solutions of the strength specified. The following experiments were tried:—

First Experiment.

	Wt. Cu in one-tenth. Gram.
Saliva and starch alone	0·0872
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 = 3 per cent. alkali	0·0220
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 + 0·012 gram NaCl	0·0287
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 + 0·012 gram Na_2HPO_4	0·0275

Second Experiment.

	Wt. Cu in one-tenth. Gram.
Saliva and starch alone	0·0844
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 = 0·3 per cent. alkali	0·0225
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 + 0·015 gram $CaHPO_4$	0·0211
Saliva and starch + 50 c.c. 0·3 per cent. Na_2CO_3 = 0·15 per cent. alkali	0·0348
Saliva and starch + 50 c.c. 0·3 per cent. Na_2CO_3 + 0·015 gram $CaHPO_4$	0·0395

It is thus very evident that these salts have little or no influence on diastatic action, in alkaline solutions of the strength used. It next remained to try the influence of the ash of the peptones in alkaline solution. The ash of 1 gram of peptones was employed, the experiment being conducted in the same manner as the preceding. The peptones used were those with 1·71 per cent. of ash. Following are the results:—

	Wt. Cu in one-tenth. Gram.
Saliva and starch alone	0·0892
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 = 0·3 per cent. alkali	0·0216
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 + ash 1 gram peptone	0·0313
Saliva and starch + 50 c.c. 0·6 per cent. Na_2CO_3 + 1 gram peptone	0·0520
Saliva and starch + 50 c.c. 0·3 per cent. Na_2CO_3 = 0·15 per cent. alkali	0·0305
Saliva and starch + 50 c.c. 0·3 per cent. Na_2CO_3 + ash 1 gram peptones	0·0400
Saliva and starch + 50 c.c. 0·3 per cent. Na_2CO_3 + 1 gram peptone	0·0740

We therefore deem it safe to conclude that the inorganic salts contained in the peptones play but an unimportant part in the stimulating action noticed in an alkaline solution of the strength specified.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 25, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

NEW PHARMACOPŒIAS FOR GERMANY AND THE UNITED STATES.

THE arrival within the last few days of a complete copy of the new edition of the United States Pharmacopœia, preceded as it was a few weeks since by copies of the new edition of the German Pharmacopœia, marks a stage in the history of pharmaceutical literature sufficiently important in these days of running to and fro over the earth to warrant more than a passing notice. Constituting as these works do two out of the four most important Pharmacopœias in the world, they must of necessity occasionally become the text-book of some pharmacists at least in many of the cities and towns of this country of cosmopolitan resort. Moreover, the report that at this moment steps are being taken towards the preparation of a new edition of the British Pharmacopœia will be sure to invest these two important books, issued almost simultaneously, with additional interest, and speculation as to how far our own national Pharmacopœia may be influenced by one or the other, or both, may well be excused, since there can be no doubt as to the qualifications of the members of the two committees to which the revision of these works was entrusted, or the ability they have manifested in accomplishing their respective tasks. It is proposed, therefore, to discuss both these Pharmacopœias in some detail in a series of articles that will shortly be commenced in this Journal, but meanwhile there are a few features that can be referred to briefly now.

It may fairly be said of the two new Pharmacopœias, without disparagement to either, that in many respects they are as unlike one another as can well be imagined, and represent what may be looked upon as two distinct types. On the one hand, there is the German Pharmacopœia, orignated by Imperial decree, having the force of law, written in Latin, and showing a distinct tendency to decrease the number of articles in the list of materia medica and preparations and to confine what is said about those that remain within the narrowest limits, not even chemical formulæ or molecular weights being given. On the other hand, the United States Pharmacopœia is a volunteer work, which is not backed by any authority beyond what it acquires through its acceptance by medical men and pharmacists and a kind of adventitious recognition which it obtains in the legislation in some of the States respecting adulteration; which is written in the vulgar tongue, and which shows a distinct tendency to include within its limits any and every substance or preparation that is ordered with moderate frequency by physicians and to describe them with considerable fulness. Perhaps of all these differences the most noteworthy appears in the fact that whilst from the German Pharmacopœia 360 articles have been struck out and only 48 added, showing a decrease of 312, in the case of the United States Pharmacopœia although 229 articles have been dismissed, there have been 256 added, resulting in an increase of 27. The net result is that whilst the former now contains only 600 articles, the latter includes just under 1000. It would appear, indeed, that whilst in Germany a conservative policy has been followed, similar to that which Professor REDWOOD described at the last meeting of the British Pharmaceutical Conference as ruling the editors of the Pharmacopœia with respect to the introduction of drugs and preparations, the policy followed in the United States has been similar to that advocated by Professor OLDBERG in a paper read before the last International Pharmaceutical Congress, on the disadvantages of therapeutical conservatism in reference to the pharmacopœial materia medica. In that paper Professor OLDBERG argued that instead of a Pharmacopœia being edited in such an exclusive spirit that the fact of a certain substance having been accorded a place in it becomes looked upon as evidence of positive therapeutic value, it should, on the contrary, include descriptions of all new remedies which, in the opinion of the revisers, might present a probability of usefulness, in order that members of the medical profession who might desire to investigate more closely the properties of such remedies might be able to identify them, and ensure the genuineness of the substances they use. It must be admitted that such an argument would in no country have greater force than in the United States, where the competition in searching out new remedies and bringing them before the medical public as specialties is keener than, perhaps, in any other part of the world. Moreover, a United States Pharmacopœia must needs be a somewhat inclusive one, not only in consequence of the vast extent of country over which it is intended to do service, covering many districts capable of contributing to it from their local materia medica, but because of the continual immigration of people of every nationality, each with its peculiarities, prejudices and wants in respect to medicine as well as other things. But in view of the present state of things it is interesting to note that in the preface to the first edition of the United States Pharmacopœia, published in 1820, the fault, *par excellence*, then specified as existing in the lists of materia medica that had been adopted in other countries was their redundancy. In fact, the "secondary list," which has hitherto been a feature of the United States Pharmacopœia, but has now dis-

appeared, appears to have been the result of a compromise between a disinclination to admit articles other than those that had already an established reputation and the impossibility of ignoring altogether many indigenous aspirants to that position.

There are, however, also some important points of resemblance between the two Pharmacopœias. The adoption in the United States Pharmacopœia of the method of expressing formulæ, as a rule, in parts by weight, instead of the actual weights and measures, as in the last edition, and the favour shown towards the metric system where opportunity offered, manifest an important approximation towards the methods followed in its German contemporary. Another point of resemblance, and not the least satisfactory, is that each of these books is the product of the labours of a committee in which pharmacists took part upon an equal footing with the medical profession, and in each case with a result that quite justifies their having been accorded such a position and that reflects honour upon their calling.

THE INTERFERENCE OF PUBLIC SERVANTS IN TRADING OPERATIONS.

A FORTNIGHT since, reference was made in these columns to a question that had been set down on the notice paper of the House of Commons, but had not yet been asked, as to the extent to which officials in the public service are permitted to engage in financial, commercial or industrial adventures. In the course of his reply to this question, Mr. GLADSTONE said that, speaking in general terms, there was no doubt that the claim of the State to the service of those in its employ is an exclusive claim, and he added that there was a rule of the Treasury, which was construed as an absolute rule as regarded that department, that no person employed in it should take any office or employment whatever outside the range of his official duties. But the power of the Treasury appears to be strictly limited to certain special departments, and this particular rule has, therefore, no force in respect to other departments of the public service. Mr. GLADSTONE, however, promised to lay upon the table some papers bearing on the subject and to consult Sir R. LINGEN upon his return to town.

These papers have since been issued as a parliamentary paper and consist of copies of an extract from a Treasury minute, dated March, 1849, and some correspondence upon the subject between the Home Office and the Treasury in 1877. The Treasury minute is definite enough as far as it goes, and states that their Lordships consider that the public is entitled to the whole time of its servants, and that "officers holding situations which require daily attend-"ance should not be allowed to accept employment "as directors of companies of various descriptions "requiring their personal attendance elsewhere dur-"ing office hours." The correspondence between the two departments goes more directly to the root of the question. It originated in a request from the Home Office to be informed as to any regulations issued by the Treasury bearing upon the question of allowing officers to accept nominations to local offices, such as way wardens, members of school boards, etc., and for an opinion as to whether the practice, if thought not consistent with the interests of the public service, should be discouraged or altogether forbidden. The reply from the Treasury recapitulated the points of the minute above referred to, limited as it is to employment within office hours, as representing the rule of action in the department. But their Lordships added their "strong opinion" that such extra employment is generally prejudicial to the public service, because no one can serve two masters, and in private service it was believed to be universally forbidden. Their Lordships further stated that in departments under their control they would be disposed to forbid it, or to regard it as *primâ facie* disqualifying for promotion.

It does not appear from the papers what course the Home Office decided to take in respect to the question raised; but it is a decided gain to have placed on record so clear a condemnation, by an important public department like the Treasury, of the objectionable and now widely spread practice of public servants competing with ratepayers in trading operations. For if a sound objection lies to the acceptance of an honorary office like membership of a school board, it would apply *à fortiori* against engagements entered into for the sake of pecuniary profit.

MEDICAL LEGISLATION.

ON Wednesday a deputation from the British Medical Association had an interview with the Lord President and the Vice-President of the Council to urge upon the Government the immediate necessity for legislation upon the basis of the Report of the Royal Commission upon the Medical Acts, in order to remedy the deplorable state of medical education. Lord CARLINGFORD, whilst expressing his inability to make any announcement on the part of the Government, expressed his concurrence as to the necessity for legislation and a hope that it might be effected in the course of next session.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

IN June last, at a meeting of the chemists and druggists of Aberdeen and the North-East of Scotland, it was resolved to found a Society to include the district between Forfar and Aberdeen. This has since been done by extending the operations of the existing Aberdeen Society of Chemists and Druggists, and adopting for it the above title. A circular has now been issued, signed by Mr. ALEXANDER STRACHAN, of Richmond Street, Aberdeen, inviting persons to become members, the annual subscription, dating from March, 1883, being 10*s.* 6*d.*

BRIGHTON ASSOCIATION OF PHARMACY.

A MEETING of the Association will be held in the ante-room of the Brighton Town Hall, on Friday next, December 1, when W. D. SAVAGE, Esq., J.P., will read a paper entitled "Some Thoughts suggested by Profesor ATTFIELD'S Presidential Address to the Pharmaceutical Conference at Southampton." The Chair to be taken at 8.30 p.m. by the President.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the above Association was held at the Royal Institution, November 9, 1882. The President, Mr. Councillor Woodcock, in the chair.

The minutes of the last meeting were read and confirmed.

The following donations were announced:—The *Pharmaceutical Journal*, from the Society, and the *Canadian Pharmaceutical Journal*, from the Editor.

Dr. Symes then referred to the opinions expressed by the President (in his absence), respecting the examinations of the Pharmaceutical Society, and their proposed partial conduct in the provinces. He was pleased to read the President's opinion on this question, with which he entirely concurred.

The following paper was then read—

Lime Water: its Preparation, Preservation and Estimation.

BY A. C. ABRAHAM.

So simple and common an article as lime water may be thought to be quite unworthy of attention, but it should be remembered that the more simple and easily prepared an article may be, the more blame to us if we do not make it as perfect as possible. Lime water should be a simple saturated solution of hydrate of calcium, but owing to the fact that pure hydrate of calcium is not practically obtainable, the formula of the British Pharmacopœia produces an article more or less contaminated with chlorides, sulphates, and other soluble salts. To eliminate these, it is, I believe, the general practice to use a larger proportion of slaked lime than the British Pharmacopœia orders and to reject the first washings. This practice, which is, I consider, undoubtedly the correct one, may, however lead to error if the matter is not carefully watched.

Having on more than one occasion found the lime water made in the ordinary course not satisfactory, I determined in future to have it made under my own eye and always tested. To enable me to do this, it was necessary to have it made in larger quantities and in such a manner that it could be efficiently kept and conveniently drawn off. For this purpose I devised a little apparatus which I have found to answer all its requirements admirably.

To a wide-mouthed glass bottle of the capacity of 4 or 5 gallons, and having a hole bored near the bottom, is fitted a cork, previously well soaked in melted paraffin, and having two holes, the larger to admit a funnel, and the smaller a vent peg. A large and slightly tapering wooden plug and an ordinary vent peg should be fitted to these holes while the paraffin is still soft. A paraffined cork is also inserted into the tap hole. Passing through this cork is a tube bent upwards inside and projecting slightly outside. Instead of an ordinary stopcock, all kinds of which have objections, an india-rubber tube with a pinch-cock and a bent glass tube is adapted for drawing off the liquid.

Several pounds of lime should now be slaked: a large quantity of distilled water poured on, and, after subsidence, the clear liquid thrown away. This should be repeated until the lime water, when rendered slightly acid with nitric acid, is no longer precipitated by nitrate of silver. When this is the case, it should be stirred up and the lighter portions poured off from any stony matter which may be present, into the bottle before described, which is then filled up with distilled water, well stirred, and allowed to subside.

The advantage of having the tap hole near the bottom of the bottle is that by simply turning the tube, its upper end may be lowered so that nearly all the supernatant liquid can be drawn off from the deposit without drawing with it any of the particles which adhere to the sides of the bottle.

To enable the lime water to be tested without inconvenience each time it is made, I have been in the habit of running off into each of a number of suitable bottles quantities of 40 fl. gr. of volumetric solution of oxalic acid made half the strength of that ordered by the British Pharmacopœia.

I may say that I always use the latter, in consequence of the fact that if made of the full strength it crystallizes out if subjected to a temperature much, if any, below 60° F., and is very troublesome to redissolve without applying a heat which may cause a loss of water.

Each 40 fl. gr. of this solution should, according to the Pharmacopœia, be rendered alkaline by 1 fl. oz. of lime water. For some time after taking these precautions every sample answered perfectly to the required test. At last, however, to my surprise the lime water failed to do what was expected of it. I first blamed the man who had been charged to stir it, but I found that no amount of stirring would make any difference.

It then occurred to me that the chlorides or sulphates might exercise some influence on the solubility. I tried sulphate and chloride of sodium, but although the former, on the first experiment, did raise the standard above that of the Pharmacopœia,* I soon found that it was not to be relied upon.

It had not previously occurred to me that the Pharmacopœia sailed so close to the wind that a few degrees of temperature could make the difference. Such, however, I found to be the case; the weather had become warmer, and, as everyone knows, lime is less soluble in hot than cold water, consequently lime water could not be made at that time of the year of the recognized strength.

Watts, in his 'Dictionary,' quoting Dalton as his authority, gives the solubility at 60° F. as 1 in 778, almost exactly the *minimum* of the Pharmacopœia, which is equivalent to 1 in 781. My experiments very closely tally with these figures as far as 60° F. is concerned. As, however, even our British summers will not always permit this temperature to be maintained, I think that 70° should at least be calculated upon and at this temperature, according to my experiments, the solubility is reduced not very far from 10 per cent.

I would, therefore, suggest the reduction of the quantity of volumetric solution given as the minimum required from 200 to 180 fl. gr.

I regret that I am unable to give the exact solubilities at all temperatures between 60°, and, say, 75° or 80°, but the difficulties are greater than might be supposed, owing to the rapidity with which the lime is dssolved if the liquid is allowed to cool even, for instance, from the exposure during filtration. The only estimations, indeed, upon which I can rely, except those in which an even temperature was maintained for some time, were made by using a filter under the surface of the liquid from which samples were drawn by means of a syphon.

I should say that before adopting the plan described I had been in the habit of using a syphon, passing through a cork and started by means of a blow-tube. This arrangement had, however, several disadvantages.

Mr. Conroy, in proposing a vote of thanks, said that he also had found it impossible sometimes in preparing lime water to attain the Pharmacopœia strength, but had not recognized the cause, not indeed being aware of the great effect of temperature. He asked Mr. Abraham whether he had found it necessary to re-stir the lime water from time to time, to make good the loss due to surface carbonation. He also expressed his decided preference for the method recommended for drawing off, compared to that previously adopted by Mr. Abraham, viz., by a syphon and a blow-tube, by which means carbonic acid was introduced from the lungs.

Dr. C. Symes thought that no apology was necessary

* No doubt by slightly lowering the temperature.

for bringing this subject forward, especially seeing that there had been prosecutions, and indeed one was then pending, for selling lime water which was not of the proper strength. It was therefore of importance to have placed before them any means by which the preparation could be made, so as to insure chemists from the danger of being prosecuted for an unintentional fault. The apparatus described seemed to fulfil the required conditions. He had at one time himself been in the habit of using, for the purpose of drawing off the supernatant liquid from deposits, a glass tube passing upwards from the bottom of the vessel and sliding through a short piece of india-rubber tube. This arrangement he thought had one advantage, viz., that by moving the tube above the surface of the liquid, the settlement therein of lime, after stirring, which he thought might involve the running off of a gallon or say half a gallon of liquid, was avoided. He concluded by supporting the vote of thanks.

This having been given, Mr. Abraham replied. He explained that he had not found it necessary to re-stir the lime, and that indeed the diffusion more than neutralized the effect of carbonation, which was extremely slight. As air only contained a very minute quantity of carbonic acid, and as his plan had been adopted so that only sufficient air should be admitted to allow the liquid to run out, this difficulty was avoided. Mr. Conroy's objection to the method of using a blow-tube, was no doubt correct, although practically, very little air was required from the lungs to start a small syphon. The plan sketched by Dr. Symes was, no doubt, a good one, but for this purpose, he preferred his own. With regard to the quantity of liquid requiring to be drawn off to remove any sediment from the exit pipe, he had not found nearly so much as a gallon necessary; on the contrary, one or two ounces, he believed, was sufficient.

There was one matter which he had not mentioned. the Pharmacopœia ordered the use of lime water for the preparation of oxide of silver, but did not recommend any means for the removal of chlorides. If chlorides were not well removed before using for this purpose, there would probably be more chloride than oxide of silver present in the product.

The proceedings then terminated.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The fourteenth annual meeting was held in the Memorial Hall, on Wednesday evening, November 8, Mr. W. Wilkinson, Vice-President, in the chair.

The annual report of the Council was read by Mr. Benger, Honorary Secretary. Since the last annual meeting, the members had not been called together monthly as in former years, the attendance at meetings of a scientific character having become too small to encourage authors of papers to expend time and trouble in preparing for them. The Council had, however, met frequently, a fourth edition of the 'Manchester Price List' had been published and they had endeavoured, as far as their influence went, to encourage a spirit of loyalty to each other amongst members of the trade in the district. Late in the autumn a letter had been received from Mr. Siebold, who had for so many years conducted the classes in connection with the Association, stating that his numerous engagements compelled him to relinquish the post he had held with so much pleasure. In accepting Mr. Siebold's resignation, the Council had expressed their regret at losing his valuable services. It was then too late to reorganize classes for the present session, but some important propositions had been received from the leading educational institutions of the city, and the Council hoped shortly to have a programme ready to lay before the members. In the meantime classes were being held in Manchester by private teachers which would meet the immediate requirements of pharmaceutical students.

The following report on the classes had been received from Mr. Siebold:—

"Gentlemen,—The lecture courses of the past session of the Manchester School of Pharmacy commenced on October 11, 1881, and terminated on May 19, 1882. In accordance with the circular issued by the Honorary Secretary in September, 1881, the following courses were delivered by me during the session:—Pharmaceutical Chemistry, including the Elements of Physics: thirty-five lectures, on Tuesday evenings, from 7.30 to 8.45. Fee 35*s*. Materia Medica and Pharmacy: twenty-five lectures, on Tuesday evenings, from 8.45 to 9.45. Fee 25*s*. Structural Botany: fifteen lectures, on Friday evenings, from 7.30 to 8.30. Fee 15*s*. Composition fee, admitting the student to all three courses, £3 10*s*. Fourteen students entered for the chemistry course, twelve for the course of materia medica and pharmacy, and eight for the botany course, making a total of thirty-four entries. The fees received amounted in all to £42. Throughout the session the regularity of attendances and the attention paid by the students to the lectures were very satisfactory; and it gives me the greatest pleasure to remember that I was able to report in equally favourable terms at the close of every one of the twelve sessions during which I have filled the post of lecturer to our Society's school.

"In now resigning my appointment into your hands I have great pleasure in thanking you most sincerely for the confidence and kind appreciation of my services with which you have always favoured me, and in thanking the students of all the past sessions for their kind and sympathetic attention."

Mr. G. S. Woolley, Treasurer, presented his statement of account, showing a balance in hand of £7 1*s*. 8*d*. on the general account, and £11 1*s*. on the Library Fund.

The Chairman, in moving the adoption of the report and Treasurer's statement, said he regretted very much, as he was sure they all would, that the state of the President's health did not allow him to come amongst them, for they all knew how much they had been indebted to Mr. Brown, who was always ready to further the interests of the Society by every means in his power. The report was not so satisfactory as could be wished, but the truth was that the efforts of the Council were not supported by the members of the trade, and it was useless attempting to hold meetings for scientific discussion or other purposes if the members would not attend. With regard to the lectures and classes of study, they had not been able to arrange them, in consequence of Mr. Siebold's resignation, but it was hoped that before another session some satisfactory arrangements would be made if only a sufficient number of students presented themselves. Speaking of the price list, it was satisfactory to find that it was in pretty general request in various parts of the country; indeed, the chief reason for the issue of the new edition was that Mr. Silverlock was continually applied to for copies which he could not supply; the last edition, published in 1880, being out of print. There were no burning questions in matters affecting pharmacists at present, but should any such arise he had no doubt that the Association would be found at the front and do good service, as it had done on former occasions.

Mr. Woolley regretted that so few of the chemists of Manchester and Salford took an interest in the affairs of the Association. This was the more deplorable and incomprehensible when the advisability of united action was becoming every day more and more obvious. He had hoped that a sufficient number of members would have been present to have had a discussion on the educational question, of which a good deal had been heard lately. Surely it was worth while to devote an evening occasionally to the discussion of topics of such vital importance to the trade, and which were continually cropping up. He quoted an instance, showing that the actual meaning of the words "compulsory curriculum" was not understood in all quarters; they had a somewhat

harsh sound, and the idea of being compelled to do a thing was distasteful. Still, if they would consider the proposal fairly, they would see that there was nothing but good in it, the object aimed at being the welfare of the young men engaged in, and who may enter the trade in the future.

After some further remarks on the subject of the curriculum, Mr. Woolley pointed out the importance of those young men, who wished to join classes, sending in their names so as to enable the Council to make suitable arrangements. He also alluded to the new edition of the 'Manchester List of Retail Prices,' upon which the committee had expended a considerable amount of labour. Former editions had been favourably received, and largely appreciated throughout the country.

Mr. Benjamin Robinson, in supporting the motion, begged to observe, in answer to a question just asked, that the Council, in making arrangements for the various classes each session, had always been mindful that the lectures and instruction given at those classes should be specially adapted to meet the requirements of the students. The great obstacle that the Council had to contend with was not the organization of classes, but the difficulty of getting a sufficient number of young men to attend them. The Council at the present moment was in this dilemma. Two educational institutions in the city were quite willing to enter into arrangements for a series of lectures to be delivered solely for the instruction of pharmaceutical students, but the Council was deterred from entering into any engagement with them, in consequence of the great indifference shown by the majority of the young men for whom these lectures were intended.

Mr. J. L. Slack said, although there were some depressing circumstances connected with the meeting, arising from the apathy of those for whose benefit the Association was formed, he could not allow that in any sense the Association was a failure. The Council was able and willing to carry on lectures and classes if the fees were forthcoming, but not to incur pecuniary loss. The Association had done great good by bringing the trade together, affording the only means for the druggists to become personally known to each other; thus increasing the mutual confidence and respect that ought to exist, and also affording the readiest means of acting in case any emergency should arise threatening the trade interests.

Mr. A. H. Jackson, B.Sc., Mr. Holt, Mr. Benger, Mr. Cooper, Mr. Stokoe, Mr. Boden and others took part in the discussion.

The following gentlemen were elected officers of the Council for the ensuing year:—

President, Mr. W. Scott Brown; Vice-President, Mr. W. Wilkinson; Treasurer, Mr. G. S. Woolley; Honorary Secretary, Mr. F. B. Benger, F.C.S. Other members of Council:—Messrs. Blain, Boor, Botham, Bowden, Drinkwater, A. H. Jackson, B.Sc., S. Kay, Robinson, Slack, Stones, Westmacott and Hermann Woolley.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES ASSOCIATION.

A lecture was delivered at the rooms of the above Association, on Wednesday evening, November 15, by Mr. H. Pickering, on "Galvanic Electricity." The chair was taken by Mr. J. J. Edwards, President, and there was a large attendance.

The lecturer had explained in a previous lecture the theory of the subject, and the different kinds of batteries, their structures and powers. He now explained the electro-magnet and its use in the electric telegraph, which he illustrated by experiment. A model electric railway was also shown in working order, also a small electric engine suitable for working a powder mixer or pill coater. Edison and Swan's lamps for the electric light were shown and their adaptability for general use explained. The lecturer also performed a number of experiments, showing the different uses to which this important science was applied, which brought a very instructive and interesting lecture to a close.

Mr. Edwards proposed a hearty vote of thanks to the lecturer which was ably seconded by Mr. Thully, and carried unanimously.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 16, Professor J. Dewar, F.R.S., Vice-President, in the chair.

It was announced that a ballot for the election of Fellows would take place at the next meeting (December 7).

The following certificates were read for the first time:—J. Brock, A. M. Chance, H. C. Foote, W. Fox, J. A. M. Fallon, F. Gothard, Joowansinghji, R. B. Lee, T. Turner, J. E. Tuit.

During the evening a ballot was held and the Scrutineers, Dr. Japp and Mr. J. M. Thomson, declared the following to be duly elected Fellows:—J. Ferrier, T. Hughes, J. Hodgkin, F. Jordan, G. Jarmay, W. C. Nicholson, H. H. Robinson, L. Reid, J. E. Stead, G. H. Sharpe, P. G. Sanford, E. S. Spalding, C. J. Waterfall.

Mr. Warington then read a paper entitled—

Contributions to the Chemistry of Tartaric and Citric Acids. By the late Beaumont J. Grosjean.—Mr. Warington said that for five years, 1870–1875, he had worked in the laboratory at Millwall with the author of this paper, who had since then been the sole chemist till his death in June, 1882. Mr. Warington had, with the consent of Sir J. B. Lawes, compiled from the laboratory note books of the late author an abstract of his numerous unpublished investigations. 1. On the different rates of loss of different specimens of citric acid in dry air. Three specimens of different samples of citric acid were powdered and placed in two desiccators over fresh oil of vitriol on April 21, 1880; on May 6 one specimen had lost 0·68 per cent., the second 6·25 per cent., the third 8·55 per cent. On May 15 the first had lost 1·75 per cent., the second 8·55 per cent. On June 21 the first specimen had lost 8·47 per cent. The theoretical amount of moisture present was 8·57 per cent. 2. Determination of citric acid in lemon and other juices. The method used by precipitation with $CaCl_2$, etc., has already been described (*Chem. Soc. Jour.*, 1875, 931). It appears that the precipitable acid in commercial concentrated lemon juice is, on the average, very nearly equal in quantity to the free acid present. Thus, in 65 analyses, representing 895 pipes, the precipitated acid averaged 99·2 per cent. of the free acid. Some exceptional samples gave numbers from 85·8 per cent. to 103·6 per cent. In bergamot juice the average number from 90 pipes was 98·4 per cent.; in lime juice 91 to 92 per cent. In orange juice about 68·5 per cent. of the free acid was found to be precipitable. Thus, while the determination of the free acid gives trustworthy results with lemon juice, it furnishes with lime and orange juice a very unsafe guide to the quantity of citric acid present. 3. Influence of heat on solutions of tartaric acid. Forty grams of tartaric acid were dissolved in water and concentrated till a crust formed. The acidity was now reduced to 97·9 per cent. of the original acid, while the orthotartaric acid, precipitated by potassium citrate, was only 74·6 per cent. On diluting and boiling for two hours the solution gave 99·0 per cent. free acidity and 99·9 per cent. orthotartaric acid. The metatartaric acid, formed as above, is also slowly reconverted into orthotartaric acid by standing in dilute solution at the ordinary temperature. Thus, the percentage of orthotartaric acid

in the above solution increased after standing two months from 74·6 to 90·0. 4. Influence of sulphuric acid on the crystallization of tartaric acid. Sulphuric acid considerably diminishes the solubility of tartaric acid. Much more tartaric acid crystallizes out from a saturated solution in dilute sulphuric acid than from a hot saturated aqueous solution; the latter deposits only 50 per cent. of its tartaric acid on cooling, whilst a hot solution in 1 volume of water and 1½ volume of oil of vitriol deposits 70 per cent. of its tartaric acid. 5. Actions of solutions of potassium and sodium sulphates on calcium tartrate. In the ordinary manufacture of tartaric acid, moist gypsum is added to decompose neutral tartrate of potash and precipitate calcium tartrate; under certain conditions this reaction is reversed, and if the solutions of potassium or sodium sulphate be sufficiently strong, practically the whole of the tartaric acid in calcium tartrate may be brought into solution as potassium or sodium tartrate. 6. Destruction of citrates and tartrates by peroxide of hydrogen. 7. Destruction of neutral tartrates when their solutions are heated with iron salts. 8. Determination of free sulphuric acid in tartaric acid liquors. To ascertain when enough sulphuric acid has been added to decompose the calcium tartrate, the workman usually adds a few drops of calcium chloride solution; if a precipitate appears in a few minutes, free sulphuric acid is present. It is proved in the present paper that this test, with certain precautions as to time and dilution, may be used quantitatively. 9. Determination of tartaric acid by precipitation as acid potassium tartrate. The ordinary method consists in the precipitation of tartaric acid with an excess of potassium citrate, washing the precipitated bitartrate with a 5 per cent. solution of potassium chloride, saturated with bitartrate, and determining by titration the acidity of the precipitate. This method is subject to two errors, one of excess due to the precipitation of an acid citrate, and one of deficiency due to the solubility of bitartrate in solutions of citric acid and potassium citrate. The author concludes that in all accurate determinations it is necessary to make preliminary experiments with graduated quantities of potassium citrate to discover the proportion which gives a precipitate of maximum acidity. This being ascertained a final determination is made with this quantity, the precipitate thoroughly washed and its acidity determined. If much sulphuric acid is present the result is usually about 1 per cent. in excess of the truth. 10. Detection of tartaric acid in the presence of citric acid, Cailletet's bichromate test (*Chem. Soc. Jour. Abstracts*, 1879, 674) gives satisfactory results. 11. Determination of organic acids from the neutralizing capacity of the ash of the salts. With potassium or sodium salts the ignition must be effected by a spirit lamp, *i.e.*, at a low temperature to avoid loss. 12. Standardizing of alkali used in titration. The best material for this purpose is acid potassium tartrate; it is easily prepared pure, can be dried at 100, is not hygroscopic, and being of low acidity a large weight can be taken.

Mr. C. F. Cross then communicated briefly the three following papers:—

Contributions to the Chemistry of Bast Fibre. By C. F. Cross and E. J. Bevan.—The authors detail further experiments showing that lignified fibres are to be regarded as a chemical whole, rather than the mixture which is involved in the incrustation theory. Fractional solution in the Schweitzer-Pelouse reagent and precipitation by acid give amorphous modifications of the fibre substance exhibiting uniformity in characteristic properties. With respect, moreover, to the property of giving a yellow colour with anilin sulphate, a diminution was observed, and after a second precipitation it had disappeared. That this reaction was not due to the lignose itself, but to some product of its decomposition, was confirmed by other experiments. The authors find that the mairogallol of Stenhouse and Groves gives with sodium sulphite the brilliant colour reaction characteristic of chlorinated derivatives of lignose; this, together with similarity of formula points to a probable connection between the aromatic derivatives of fibres and the trihydric phenols. The authors describe a higher chlorinated derivative of jute, $C_{38}H_{44}Cl_{11}O_{16}$, a body of identical formula being obtained from *Musa paradisiaca*.

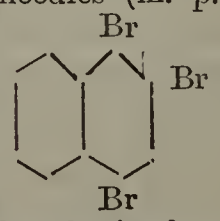
On the Oxidation of Cellulose. By C. F. Cross and E. S. Bevan.—By the action of boiling 60 per cent. nitric acid, cellulose is converted into an amorphous substance, which swells up on washing to a gummy mass. On analysis it gave constant numbers, although obtained from various sources, indicating the formula $C_{18}H_{26}O_{16}$. The authors propose the name oxycellulose. This substance yields a trinitric ether. In this and other properties it exhibits undoubted cellulosic characteristics.

On the Analysis of certain Vegetable Fibres. By C. S. Webster.—The author has investigated the following fibres:—*Ananassa S.*, *Musa P.*, *Agave*, *Phormium T.*, *Bœhmeria P.*, *Crotalaria J.*, *Linum U.*, *Urtica H.* His results comprise ultimate elementary analysis, determinations of cellulose by chlorination, and a statement of general properties and reactions. None of these fibres appear to preserve the definiteness and uniformity of the jute fibre.

Mr. Warington asked whether the jute fibre was entirely soluble by repeated treatment with bromine and ammonia.

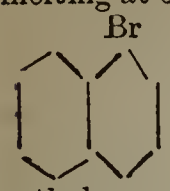
Professor Thiselton Dyer said that he was much indebted to the authors for the explanations which they had given him, from time to time, of their work in the Jodrell Laboratory, at Kew. There was no doubt that the field which lay in the borderland between vegetable physiology and organic chemistry, and in which these chemists had worked, was regarded by many scientific men with the greatest curiosity. The botanists arrived at various results empirically and were obliged to make up a sort of spurious chemistry to explain them. Thus in some way cellulose is converted into lignin; the chemist infers that cellulose is related to starch and some believe that starch is the starting point of plant life. This position is challenged by Strasburger, who thinks that cellulose and starch are formed by the breaking up of proteids. It seemed admitted by the chemist that the subject was one of the greatest importance, and yet upon turning to chemical books the crust of the subject was found to be scarcely broken; the voice of the chemist was silent where the botanist ardently desired information. He was, therefore, only too glad when two chemists expressed their intention of, at any rate, driving a furrow into this unknown tract. The botanist met constantly with such common substances as starch, cellulose, lignin, mucilage, etc., and yet the present state of knowledge about these substances was such that he was almost ashamed to ask a question about them at an examination.

On the Constitution of some Bromine Derivatives of Naphthalene. (*Third Notice*). By R. Meldola.—A careful comparison has been made by the author between Glaser's α-dibromnaphthalene produced by the direct action of bromine on $C_{10}H_8$, and the author's metadibromnaphthalene (m. p. 64°), and he concludes that these two modifications are isomeric and not identical. β-dibromnaphthalene (m. p. 81°) has been obtained by the diazo-reaction from Rother's bromnaphthylamin, thus confirming the view that this modification is a para-compound. By means of the diazo-reaction a new tribromnaphthalene has been obtained from the author's dibromnaphthylamin. This substance forms white needles (m. p. 113°–114°), and has the constitution—



By means of the diazo-reaction, the author has obtained a new dibromnaphthalene from Cosiner's brom-β-naphthylamin; it crystallizes in oblique rhombic prisms

melting at 63° and is an orthocompound of the formula—



; by the further action of bromine on orthobrom-β-acetnaphthalide the author has prepared a tetrabrom derivative of m. p. 138°. By brominating paranitracetnaphthalide a monobrom derivative has been obtained, isomeric with that of Liebermann and Scheiding; it forms pale yellow needles, m. p. 224°–225°. The author proposes that naphthalene derivatives in which the substituents are in the same benzene nucleus should be called *homonucleal*, and those in which they are in different nuclei, *heteronucleal*. It seems to be a general rule that the homonucleal diderivatives melt at lower temperatures than their heteronucleal isomerides. Thirty specimens of naphthalene derivatives obtained in the course of this and former investigations were exhibited by the author.

On the Constitution of Lophin. By F. R. Japp.—Radziszewski has communicated (*Chem. Soc. Journ. Abstracts*, 1882, 1063) a new synthesis of this substance by the interaction of benzil, benzaldehyde and ammonia and he comes to the conclusion that lophin has the constitution

$$\begin{array}{l} C_6H_5-C=N\diagdown \\ \quad\quad\quad\quad | \quad\quad\quad CH-C_6H_5 \\ C_6H_5-C=N\diagup \end{array}$$

and rejects the formula proposed by the author, which represents this substance as belonging to the class of anhydrobases described by Hübner. This latter formula was based by the author chiefly on certain analogies drawn from the reactions of phenanthraquinone with aldehydes and ammonia, and in the present paper it is shown that these analogies are well founded, and that the formula explains the known reactions of lophin more consistently than that of Radziszewski. In conclusion, the author describes an experiment which, though not absolutely conclusive, affords a strong presumption in favour of the anhydrobase formula. If it were possible by heating lophin with hydriodic acid and amorphous phosphorus to split up this body, Radziszewski's formula should yield benzaldehyde, which should be reduced to toluene; the anhydrobase formula should yield benzoic acid. Lophin, when thus heated to about 300°, does yield benzoic acid. This temperature, though high, is 100° below the temperature at which lophin boils without decomposition.

The Society then adjourned to December 7, when a ballot for the election of Fellows will be held, and the following papers will be read:—1 "On the Condensation Product of Phenanthraquinone with Ethylic Aceto-acetate," by F. R. Japp and F. W. Streatfield; 2 "On the Condensation Products of Oenanthol, Part I.," by W. H. Perkin, jun.; 3 "On the Formula of Lophin," by H. E. Armstrong; 4 "On the Molecular Weight of Basic Ferric Sulphate," by S. U. Pickering; 5 "On Certain Brominated Compounds obtained in the Manufacture of Bromine," by S. Dyson.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the present session was held on Thursday, November 16, 1882. Professor Attfield, F.R.S., President, in the chair.

After the confirmation of the minutes, Messrs. F. Ransom and W. H. Ince were appointed Scrutineers to examine the voting papers by means of which the election of officers is carried on.

The following gentlemen were elected officers for the ensuing session:—Vice-Presidents, Mr. H. G. Greenish and Mr. R. H. Parker; Members of the Executive Committee, Messrs. A. T. Job, W. E. Crow, W. F. Gulliver, J. B. Barnes; Honorary Secretary and Treasurer, Mr. Wyndham R. Dunstan, 17, Bloomsbury Square, W.C.

Mr. Hamilton then proposed, and Mr. Ince seconded, a vote of thanks to the outgoing officers, which was replied to by Mr. F. W. Short.

The President then delivered an address upon "The Pharmacopœia as a Students' Manual," which will be found on p. 421.

A discussion followed, in which Messrs. Braithwaite, Elborne, Giles, Parker, Taylor and the Secretary took part.

On the motion of the Secretary, seconded by Mr Elworthy, a vote of thanks to the President for his address was carried unanimously.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at 32A, George Street, Hanover Square, on Wednesday, November 14, 1882, the President, Mr. Wrenn, in the chair, when a paper on "The Relation between Insects and Flowers" was read by Mr. H. Cracknell.

Mr. Cracknell alluded to Sprengel as being the first who noticed that a relation existed between insects and flowers, but he pointed out that it was not until the late Charles Darwin studied the subject that we had any positive proofs of the existence of that relation. He then gave a general description of the relation existing between insects and flowers and the advantages obtained thereby, also showing how, that although plants presented at first sight every arrangement for self-fertilization, nature had really provided means in most flowers for the prevention of self-fertilization, the principal arrangements for this purpose being:—1st, the stamens and pistil are in different flowers; 2nd, the stamens and pistil are not mature at the same time; and 3rd, there exists a difference between the relative length and position of stamens and pistil. He then proceeded to give a descriptive account of how plants are fertilized by means of insects, showing also how they are adapted to the visits of insects. The first plant mentioned was the *Arum maculatum*. He showed how insects visited this plant, and when they reached the bottom of the spathe they are prevented, by means of a row of hairs pointing downwards, from leaving the flower until the stigmas have ripened, when the hairs shrivel up,—but in the meantime the anthers having ripened, the insects as they left the flower were dusted with pollen, which, if they then visited a younger flower, they deposited on to the stigmas of this flower, and thus cross-fertilization was effected. He then gave an account of the fertilization of the *Geranium pratense*, pointing out the remarkable movement of the stamens. The next flower alluded to was the *Lamium album*. This flower, he said, showed the adaptation of flowers to insects very clearly. There were also other flowers in the *Labiatæ* which were just as markedly adapted to the visits of insects, the *Salvia* being one of the most remarkable, especially as regards the arrangements of its anthers. He then mentioned the *Primula*, drawing attention to the difference in the relative length of stamens and pistil, also pointing out the difference in the size of the pollen of the two forms of *Primula*, and at the same time stating the advantages gained by these differences. He described the *Lythrum Salicaria* as being a trimorphous plant, showing the number of modes of union possible between this plant. He then proceeded to give an interesting account of the fertilization of the *Orchis mascula*. In conclusion, he drew a graphic account of insectivorous plants, *Drosera rotundifolia* being quoted as an example.

The paper was profusely illustrated by diagrams, which were very accurately drawn.

A lively discussion took place, in which Messrs. Wrenn, Alcock, Winfrey, Parkinson, Perkins and others took part.

A hearty vote of thanks to Mr. Cracknell for his valuable paper terminated a very successful meeting.

Parliamentary and Law Proceedings.

CONVICTION UNDER THE WEIGHTS AND MEASURES ACT.

On Thursday, November 2, at the Clerkenwell Police Court, Mr. John Knowles, chemist, 40, Seymour Street, was summoned for having two measures that were false and unjust.

The inspector said he had cautioned defendant in April last. He found he had still some weights and measures unstamped on his second visit. One of the measures mentioned in the summons was a 60 minims measure; it held 70 instead of 60 minims. As this measure was used for poisons and other potent drugs it was most important that it should hold the proper quantity and be stamped.

Mr. Barstow said it was a serious matter, and fined the defendant 20*s.* and costs.

IMPORTANT PROSECUTION UNDER THE SPIRITS ACT.

On Tuesday, November 21, at the Lambeth Police Court, Mr. W. J. Bush, wholesale chemist and distiller of essential oils, essences, etc., having works and premises in Artillery Lane, Bishopsgate Street, and Ash Grove, Hackney, appeared to answer several summonses under the Excise laws which had been first before the Court in August last.

The several summonses set forth the following alleged offences:—First, for using a still on July 27 last without a licence; second, for carrying on the trade of a compounder of spirits and for compounding spirits without a licence; third, for retailing spirits on July 27 without a licence; fourth, a similar offence on July 24; fifth, a similar offence on July 24; sixth, for separating gum resin from methylated spirit mixed with gum resin on July 27.

Mr. N. J. Highmore, barrister, and Mr. Squires, one of the solicitors to the Inland Revenue Department, prosecuted; and Mr. E. Pollock defended.

The case was reported upon the first hearing, when it was shown that Mr. R. W. Parry and Mr. Harper, supervisors of Excise, visited the premises of the defendant at Hackney, and found various stills at work, varying from 30 to 1000 gallons contents. Methylated spirit was found running from the worm end of the still. In answer to questions put a man there said they were distilling "a varnish or finish." Close to the still the officers found several drums containing 110 gallons of methylated spirit from which the gum had been extracted. The defendant, when spoken to, said it was the practice of the trade, and that he was ignorant of the law on the subject. An ordinary still licence was produced at the time. A visit was paid to the premises in Artillery Lane, City, where purchase was made by one of the officers of some "essences of brandy, gin, port wine, and curaçoa."

Upon the first hearing Mr. Pollock cross-examined the several witnesses and put forward his contention with regard to the meaning of the word "spirits." He also pointed out that the defendant had carried on the business for many years, and produced circulars of many others who, he said, had carried on a similar trade, and likewise pointed out with regard to the "essences," that as long back as the Exhibition of 1851, medals had been awarded for such "essences," and yet no proceedings had been taken.

After a long argument, Mr. Chance decided to adjourn his decision to give him an opportunity of looking fully into the question.

Upon the matter being again brought before the Court yesterday, Mr. Chance gave judgment. After referring to some of the facts of the case, he said that the question remaining was what penalties he ought to impose. He would take the last-named offence first, "for separating gum resin from methylated spirit mixed with gum resin," and with regard to that, he did not think there was the slightest excuse for a violation of the section of the Act, which to his mind was as clear as possible on the subject. He then proceeded to read the 131st section of the 43 and 44 Vict., bearing on the matter, and added that anyone reading that could scarcely make a mistake. With regard to that offence, he find the defendant £200. Then for using a still the same remarks would apply, and for that he imposed a penalty of £500. His only doubt at first was with regard to the offence of "compounding," but in carefully considering the various points those doubts were removed, and he did not feel justified in mitigating the penalty for that, which would be £500. With regard to the three remaining offences of retailing without a licence, he imposed three fines of £25, instead of £50 each.

Mr. Pollock said there were various points of law which he would should like to carry still further.

Mr. Chance replied that he would be glad to hear an application on a future day, and to grant a case for a superior court.

Mr. Pollock, after some further argument, asked that payment of the penalties should be suspended until he had decided what course to take.

Mr. Highmore said he had no objection so long as security was given for the payment.

Mr. Pollock said there was not the slightest objection to that.—*Standard.*

Reviews.

DIET FOR THE SICK, being Nutritious Combinations suitable for Severe Cases of Illness. By J. JAMES RIDGE, M.D., B.S., B.A., B.Sc., Lond., etc. London: J. and A. Churchill.

This is altogether an admirable little book. It is small in size, excellent in arrangement, clear in direction, scientific in principle, and is destitute of padding.

It commences with directions for making beef-tea. We all know what horribly flavourless messes sometimes go by the name. The beef is conscientiously boiled to rags, the whole is then strained, and the result is that the so-called beef-tea contains little more than gelatin.

Dr. Ridge's directions are entirely free from any scientific terms, and are capable of being understood by anyone. For making beef-tea they are so good that we reproduce them *in toto.*

"BEEF-TEA.

"1. Take 1 pound of lean gravy beef and cut it into pieces as small as possible. A sausage-machine will accomplish this most thoroughly, and thus save half the time of step No. 5, while it will enable you to extract all the goodness of the meat more thoroughly.

"2. Place the meat in a preserve jar with one saltspoonful of salt, and put the jar in a saucepan sufficiently large to allow the lid to be placed on when the jar is in it.

"3. Mix in a large jug equal quantities (carefully measured) of boiling water and cold water.

"4. Put half a pint of this mixed water into the jar which contains the meat, and pour sufficient of the remainder into the saucepan outside the jar to reach as high as the water inside the jar, then put the lid on the saucepan and place it on the hearth, *not* on the fire or on the hob. It will do no harm to cover the saucepan with a cloth or anything which will keep in the heat.

"5. The meat must remain in the jar from three-quarters of an hour to two hours, according to the fineness to which it has been chopped, being stirred every quarter of an hour. If cut into pieces a little smaller than dice, one hour and a half will be sufficient. At the end of this time take out of the jar and strain through a hair sieve, or through muslin, with gentle pressure.

"6. Place the red meat juice thus obtained in a small saucepan, and heat it to boiling while you stir. It will turn brown and curdle. Strain off the solid flakes and rub these thoroughly with a small teaspoonful of arrowroot or cornflour, then boil these again five minutes with

the liquor which was strained off, and set it on one side for the present.

"7. Now take the meat which was left in the sieve at the end of step No. 5, and put it into a saucepan with a quart of boiling water, cover, and let it simmer over a slow fire for three hours; then allow it to boil and strain immediately.

"8. Now boil this strained liquor down to half a pint.

"9. Then mix this half pint with the half pint left at the end of step No. 6, and you will have 1 pint of strong beef-tea containing all the soluble portion of the meat."

Reasons for this process are then clearly and simply given, and then follow directions for making beef-teas modified to meet varying circumstances.

The uselessness of Liebig's extract given solely as a food to the exclusion of other things is pointed out, but its value as a stimulant is fully recognized.

The book contains directions for making all kinds of broths, meat biscuits, milk and farinaceous preparations, wheys, teas and various refreshing drinks, and concludes with processes for preparing digested and partially digested foods and enemata. Dr. Ridge's methods are throughout uniformly simple and sound. We smack our lips over some of them, and though we hope we are in the most robust health, we could heartily relish some of the varieties of spoon-food, if our anything-but-neat-handed Phyllis below stairs would condescend to follow Dr. Ridge's directions.

CHEMISCH-TECHNISCHES REPERTORIUM. Uebersichtlich geordnete Mittheilungen der neuesten Erfindungen, Fortschritte und Verbesserungen auf dem Gebiete der technischen und industriellen Chemie mit Hinweis auf Maschinen, Apparate und Literatur. Herausgeben von Dr. EMIL JACOBSEN. 1881. Berlin: R. Gaertner. 1882.*

This 'Repertorium,' as stated in its title, consists of short abstracts of communications upon the latest discoveries, progress and improvements in the domain of technical and industrial chemistry, systematically arranged under suitable headings. It is now issued quarterly, the four parts of one year containing the history of the previous twelve months. Although the majority of the subjects lie outside pharmacy, few of them are so far removed as to be devoid of interest to the student of chemistry in this direction, and to any person able to read German the work presents an epitome of the technical literature scattered over a wide field, no less than one hundred and twenty-two journals being represented in the references, each by a particular number. The abstracts appear to be made with judgment; brief, but not too curt to be of use. As an example one may be quoted, not as being the best suited for the purpose, but simply because it refers to a subject upon which information has been asked for by correspondents:—

"STARCH GLAZE PREPARATIONS.— . . . Several specimens of the so-called 'starch glaze,' which at present is sent into commerce in considerable quantity, were examined. Only three samples, in powder, were analysed quantitatively. Their composition was as follows:—

	Water per cent.	Mineral Substace (Borax) per cent.	Starch calculated from difference. per cent.
No. 1 . . .	29·80	32·27	37·83
No. 2 . . .	29·94	41·04	29·22
No. 3 . . .	22·95	21·00	56·04

"The complete solubility of Nos. 1 and 2 in hot water, as well as their appearance under the microscope, showed that the starch used in their preparation had previously been rendered soluble. Probably this was done by strongly heating it under pressure and only then mixing it with the borax finely powdered. But a similar preparation may also be obtained by boiling the starch for a long time in a concentrated solution of borax, evaporating the starch solution obtained to dryness, and reducing the dried mass to a fine powder. By both methods a fine powder, consisting of borax and starch, is obtained, that with hot water forms a solution from which no starch separates upon cooling. Sample No. 3, which dissolved only after considerable boiling, was evidently only a mechanical mixture of finely powdered borax with ordinary rice starch, not rendered soluble. The addition of borax has probably for its chief object to bring the starch into solution so that it may penetrate into the tissue and thus render the pieces stiffer upon drying. But a too great addition of borax may act injuriously on the articles washed by rendering them brittle."

* Large 8vo., Part I., pp. 1–112; Part II., pp. 113–216.

A COMPENDIUM OF MODERN PHARMACY AND DRUGGISTS' FORMULARY. Fourth Edition, with Supplement. By WALTER B. KILNER, Pharmaceutist. London: Henry Kimpton. 1882.

A few months since a notice of Mr. Kilner's useful book in this Journal (vol xi., p. 756) drew forth a number of inquiries as to whether copies might be obtained in this country. We are therefore glad to have the opportunity of saying that a fourth edition has now been issued, and that it is published by Mr. Kimpton, of High Holborn.

Notes and Queries.

[739]. OIL OF PEPPERMINT.—I have noticed the same green colour; it is no doubt due to the ol. menthæ pip., as on opening a fresh bottle I found it mix with the same bulk of same sample s. v. r., quite a pale straw colour.—INCEPTOR.

[741]. SMELLING SALTS.—Equal parts of pulv. potassæ carb. (dry) and pulv. ammon. mur., rubbed together thoroughly and a few minims of ol. lavand. and ol. geranii will make a very pungent salt.—INCEPTOR.

[743]. PRESERVATION OF ESSENCE OF LEMON.—I have kept ess. limonis for years without any deterioration, by adding ½ pint distilled water to ½ gallon of essence. After a time the water at the bottom of the bottle appears loaded with resin, etc. I then decant the essence carefully and put it into another bottle and add more water, and repeat this when required. By this plan I have kept essence of lemon unaltered for eight years.—PERCY WELLS.

[743]. PRESERVATION OF ESSENCE OF LEMON.—W. L. would find 10 per cent. of alcohol quite sufficient.—374.

[743]. With reference to the query concerning the preservation of ess. lemon. I would state that having heard some years ago that ess. lemon might be preserved in its purity of odour by keeping it with its bulk of water in small bottles, I placed some in a small vial; after the lapse of at least a twelvemonth, it was apparently unaltered.—H. J. B.

[743]. I have found the best way to keep essence of lemon, is to mix it with equal parts of absolute alcohol, or to put it into ℥j. or ℥ij. bottles, and hermetically seal it, only using from one bottle at a time.—FOSSIL.

[744]. POTASH POWDERS.—I should think potash powders could be made as ordinary gasogene charges, only substituting pot. bicarb. for sodæ bicarb.—374.

[745]. BORACIC ACID LINT.—Will any reader kindly inform me how to make "Lister's boracic acid lint?"—W. L. P.

[746]. CLEANING OF FOSSILS.—I have a number of fossils, etc., which have become discoloured. Could anyone kindly inform me the best way to clean them? Also to clean white coral?—FOSSIL.

[747]. PULV. ALK. CO.—The formula for "pulv. alk. co." as prescribed by Dr. Bell, of Glasgow, would greatly oblige.—23.

Correspondence.

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

Golden Ointment.

Sir,—While thanking Mr. Alfred E. Tanner for his courtesy in publishing the result of his examination of Singleton's golden eye ointment, an analysis that undoubtedly establishes the composition of the article as at present manufactured, I must, in the absence of the paper to which he refers, and which a search I have made with some diligence has altogether failed to discover, ask his pardon for disagreeing with one of the opening sentences of his contribution, in which he states that the matter has some time since been set at rest and can no longer be considered a debatable question.

Coinciding, to a certain extent, with his opinion that the work of former investigators would be much the better for verification or otherwise by persons who could bring to their aid the discoveries which a long lapse of years has produced, I do not think that modern experimentalists should, without the deepest consideration and almost incontrovertible proofs, cast doubts upon the deliberate assertions of authorities who, like Dr. Paris, stand, preeminent amongst the pharmacologists of our country.

Mr. Tanner, I think, will readily acknowledge that no one with the attainments of the author of such a work as 'Pharmacologia' would be unable to tell the difference between an ointment prepared with red oxide of mercury and another containing such a totally dissimilar ingredient as orpiment, nor would he, after stating that the ung. hydrarg. nit. oxid. of the London Pharmacopœia was sold as a substitute for the original preparation, affirm that the genuine "golden eye-salve," which, according to Mr. Tanner, would be almost identical in appearance, owed its properties and colour, not even to the red sulphide, realgar, but to a yellow pigment like orpiment; and when the citrine or yellow ointment of Edinburgh was introduced into the London Pharmacopœia for the purpose, as Dr. Christison wrote in 1842 ('Dispensatory,' 1st edition, p. 531) of "imitating as exactly as possible a nostrum well-known by the name of golden eye-ointment," a view in which he is supported by Nevins, Royle, Squire and others, can any one consider that the compilers were attempting to produce a preparation which would be recognized by the general public as identical in composition with the so-called "golden ointment" they had been accustomed to?

Since Mr. Tanner's letter has appeared I have been at some pains, by an examination of contemporary authors, to gain a little light upon the subject. I find Cooley in 1855, more than thirty years after the statement of Dr. Paris had appeared, after quoting the remarks in 'Pharmacologia,' writing:—"There appears to be some mistake in this, as that sold us under the name had nearly the same composition as the ung. hydrarg. nit. oxid. of the Pharmacopœia. It did not contain of arsenic or sulphur. The action of the nostrum and the reputation it has acquired fully justify our conclusions."

This effectually proves that the ointment as sold at that time was composed of the red oxide of mercury, but does not by any means assert that the preparation was the same at the time to which Mr. Cripps referred in his paper; and I may add here that the last sentence of the paragraph I have quoted from Cooley cannot be advanced in evidence to the contrary, as there is no doubt but that orpiment is not only a good, but a valuable remedy for certain eye diseases, and especially for those in which the "golden ointment" was recommended. This fact may possibly not be so apparent to many of your readers, therefore I may just mention that the following prescription, published in the *Dublin Quarterly Journal of Medical Science* (September, 1870), was put forward as a valuable specific for granular lids and in all cases of chronic ophthalmia:—

℞	Arsenici Sulphureti . .	gr. ij.
	Unguenti Citrini .	ʒij.
	Axungiæ Præparatæ	ʒvj.

Misce bene.

My researches have led me to the conclusion that the original "golden ointment" which was the indirect means of securing a place for ung. hydrarg. nitratis in the London Pharmacopœia was of a yellow and not of a red colour, in fact the hue was so pronounced that Christison, Duncan, and others undoubtedly considered it to consist only of well prepared citrine ointment, and hence their endeavours to improve their own formulæ; in support of this statement I may mention that Barker and Montgomery ('Transl. Dub. Pharm.'), writing in 1830, say that they think the difference in the two preparations was due to the fact that unsalted butter was used as the basis of the secret nostrum. Duncan, also ('New Dispensatory,' 12th edition, p. 1050), about the same date expressly mentions that both the "empirical remedy" and the citrine ointment, as prepared by his namesake's process, had a "fine golden colour," a description which could not justly be applied to a preparation of the red oxide.

On these grounds I think that the question is narrowed to one of the following substances:—the yellow oxide of Mr. Cripps, citrine ointment or arsenious sulphide. There are several reasons why the yellow oxide of mercury may not be considered the specific ingredient; in the first place the substance itself is only of recent introduction and cannot be said to possess in any special degree the particular remedial qualities "golden ointment" was famous for. Again I am unable to see what authority Mr. Cripps has for noticing it, unless a statement by the compiler of the 'Chemists and Druggists' Diary (1881) will account for the circumstance; the writer, after quoting Dr. Paris, asserts that a very general impression is current that Singleton's "golden ointment" is prepared with precipitated mercuric oxide, and this is the only case in which I find the yellow oxide even mentioned. With regard to citrine ointment I do not think it in any degree probable that Dr. Paris, well acquainted with the ordinarily accepted opinion, would have gone out of his way to state definitely that orpiment was the active constituent without having first satisfied himself by careful analysis that the announcement would be correct.

The only way in which I can account for the statement in Gray and Redwood's 'Supplement,' etc., that the ointment was prepared with realgar is by supposing that having seen the sulphuret of arsenic mentioned by Paris, they, from a superficial examination of the proprietary article, considered that he had intended the red variety, realgar, and not orpiment as stated.

Elden Grove, Rockferry, Cheshire. J. E. Saul.

M. Leigh.—A *résumé* of one of the most interesting cases of the occurrence of disease germs in milk will be found in vol. i. of the present series of this Journal, p. 616.

Chemicus and *An Apprentice.*—We cannot supply technical information to anonymous correspondents who do not comply with the rule printed weekly at the commencement of the "Correspondence."

Inquirer.—The book is a good one as far as it goes, but you are advised not to limit your chemical studies to the pages of a single work.

Inquirer.—The General Medical Council does not conduct a preliminary examination.

X.—See a note on green extracts in suppositories in vol. ix., p. 949.

G. L. Lloyd.—See the last paragraph in a note by Dr. Vulpius, printed in the *Pharm. Journ.* for April 8 last, p. 825.

R. G. Bumpstead.—The names of the writers were appended to all the letters that appeared on the subject.

W. Miller.—(1) Yes. (2) Too fragmentary to determine. (3) *Cornus sanguinea.* (4) Yes. (5) *Clematis vita-alba.* (6) *Euphorbia amygdaloides.*

Chemicus.—The subject has already been frequently discussed in this Journal. See several papers in vol. xi. of the second series, and especially one on p. 542.

An Old Subscriber.—We should think that dilute glycerine would answer the purpose.

Communications, Letters, etc., have been received from Messrs. Shenstone, Pollard, Tichborne, Napier, Hogg, H. J. B.

FIVE GOLD MEDALS AWARDED.

We have received the following letter from Dr. Josiah Williams, which we have much pleasure in publishing:—

"ANOTHER SEVERE TEST."

Messrs. John Richardson & Co., Leicester.

Sheffield, June 22nd, 1882.

Gentlemen,

I have just returned to Sheffield after six months' travel through Italy, Egypt, Central Africa, and Abyssinia, and knowing that you have a very large trading connection abroad, I am induced to send you the following particulars of the excellence of your Pearl-Coated Pills.

I took with me over 30 gross of various Formulæ of your Coated Pills, and they were subjected to the following severe tests of temperature:—We were three weeks in crossing the Desert from Suakin to Kassala; the first day was a journey of the most unpleasant nature through torrents of rain: this found its way into the Medicine Chest, making the straw in which the medicines were packed very damp; after this, the heat was excessive every day (Solar Thermometer 150° Fah.), causing the interior of the chest to be quite hot and steamy for a day or two. In passing through the Kunama Country up to Abyssinia the temperature at mid-day was 100° Fah. in the shade, sinking by 10 p.m. to 37°. Later on, whilst amongst the Hamram Arabs, we had the temp. as high as 106° in the shade, but notwithstanding this immense variation of temperature, I found your Coated Pills perfect in every particular, not one of them cracked or discoloured.

It affords me the greatest possible pleasure to communicate the above testimony, and beg of you to make any use you may deem desirable of my experience.

I am, Gentlemen, yours very truly,
JOSIAH WILLIAMS.

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Dr. ARTHUR HILL HASSALL, M.D. : "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

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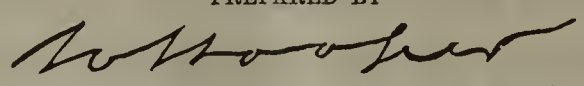

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Syr. Cinchonæ Alcoholicus, Schacht.
Bark minus the woody fibre. Dose, 10 to 30 drops, diluted.

Liquor Rhamni Frangulæ, Giles.
A real aperient, mild and constant. Dose, ʒij. to ʒiv., diluted.

Syrupus Sennæ Aromaticus, Giles.
Made by cold maceration—does not gripe. Dose, ʒj. to ʒij.

Extractum Cinchonæ Liquidum, Giles
Exhausted entirely with cold water, and prepared by a process specially devised to avoid the changes inseparable from prolonged evaporation. Dose, 10 to 20 drops, diluted.

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Agents required in every Town. Handbills, Pamphlets, Posters, Show Cards, for these and their other preparations—"GLYCERINE DIP," the original LUDDINGTON'S OILS, BUTTER POWDER, "GRANULAR BROWNING," DANDELION COCOA —supplied on receipt of trade address.

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Of standard strength (1 to 5). Manufactured with improved machinery and guaranteed equal to any made. Put up in tins and drums of all sizes to 1 cwt. (no name on label). Carriage paid. Very low quotations and favourable terms on application.

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Containing *all* the oil. Special attention is paid to this article, which we crush ourselves from Linseed expressly cleaned and selected for the purpose. In free bags, forwarded *freshly crushed* same day as order received. Price 18/6 cwt. Special quotations for 5 cwts. or more. Second quality, 17/6 cwt. Samples free.

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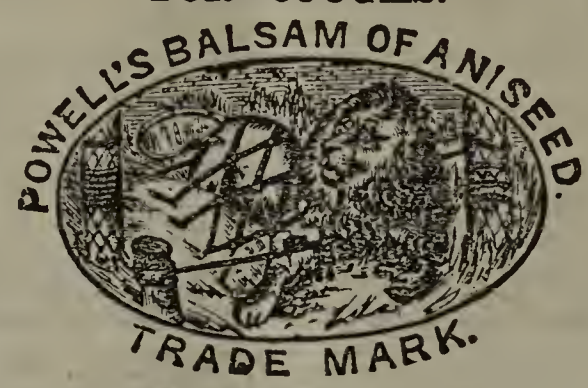

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Office, 153, Upper Thames St., have reduced their prices as under for quantities of not less than 6 gross of assorted sizes.

		per gross.
3 & 4 oz., clear blue tinted, plain or graduated		7s. 6d.
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1 oz. ,, ,,	Plain or graduated to teaspoons. Long or short series.	4s. 6d.
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We put **Name and Address on the flat shape bottles, if required, without any extra charge whatever.** Country packages 1s. each. P. O. Orders to be made payable at Chief Office, London. Bankers, London and Westminster Bank. Established upwards of Fifty Years.

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These Preparations received a First-Class Award (the Highest Obtainable), at the International Medical and Sanitary Exhibition, South Kensington.

LIQUOR PANCREATICUS (BENGER)—For the Preparation of Peptonised or Artificially Digested Food. Bottles, 2s. 6d., 4s. 6d., and 8s. 6d., with full directions.

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BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

Of all leading Wholesale and Retail houses.

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TASTELESS PILLS

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Dated and Sealed April 13, 1854.

Chemists selling Tasteless Pills *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

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BROKEN-LEAF TEA, 1s. 8d. per lb.

A MONEY SAVING TEA. ABSOLUTELY PURE.

The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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Prospectus and samples free on application.

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Students who desire to commence to read up for their Examinations, but who are unable at present to leave their business engagements, are advised at once to enter under

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Under this system one or more Lectures are forwarded weekly, to be mastered by the Student, and examination papers are sent monthly to test his progress.

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Syllabus, opinions of the press, and testimonials sent on application to Messrs. Wills & Wootton, Trinity Square, London, S.E.

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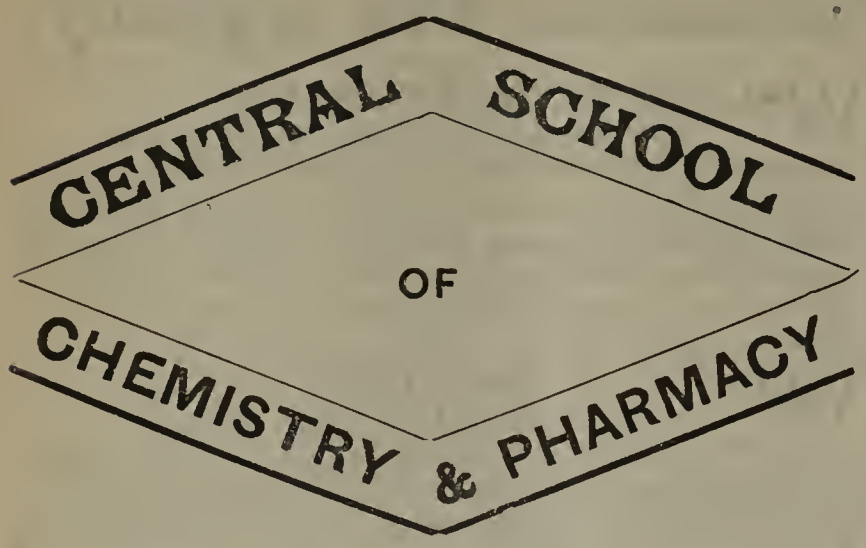

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The next complete course of Lectures and Classes will commence on

MONDAY, January 1st, 1883,

when the Lectures will be given by the Teachers, Mr. A. P. LUFF (who has now returned from Australia and New Zealand, recruited in health) and Mr. J. WOODLAND, assisted by the Demonstrator, Mr. FOWLER.

The experience of the Lecturers, combined with their successful method of teaching, will ensure to all Students who attend the classes of this School a thorough preparation for the examinations before them, and at the same time the information most useful in their daily avocations.

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325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. BAXTER, Secretary.

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Special Classes to prepare Candidates for the Preliminary Examination of the Pharmaceutical Society are held daily, from 10 to 12 a.m., on the following subjects:

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Gentlemen engaged during the day, and unable to leave business, may be prepared for the Pharmaceutical Examinations in the evening.

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AS Junior or Improver. 5 years' experience with a Surgeon. Age 19. Height 5ft. 10in. Passed Preliminary. Salary no object. Excellent references. G. Stafford, 29, Broad St., Welshpool.

TEMPORARY and Locum Tenens. Town or country. Terms moderate. References, testimonials, and full particulars on application. R. E. Bunn. Private address: 12, Unity Pl., Woolwich, Kent.

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ENGAGEMENTS WANTED.

AS Junior. London preferred. 5 years' good experience. Age 20½. Height 5ft. 10in. Disengaged Dec. 9. For particulars, Chemicus, 50, Elgin Cres., Notting Hill, W.

AS Junior. Age 20. Height 5ft. 8in. 6 years' experience in town and country. Highest references. Louis Beckett, 82, King's Rd., S.W.

BY a Chemist and Druggist. Responsible situation in Wholesale House, Factory, or Chemical Works. Address, with salary, H. S., 9, Queen's Parade, Brandon Hill, Bristol.

TO gain experience in Retail Drug trade, in London or suburbs. Knowledge of Dispensing. Age 26. Will give services and stipulated sum per week in return for board and lodging. C. L. Lodge, 43, Lincoln's Inn Fields, W.C.

AS Junior. In London. Age 22. 6 years' town and country experience. Accustomed to Dispensing, Prescibing, and Extracting Teeth. Salary £40. City preferred. H. Harries, Post Office, Clarbeston Rd., Pembrokeshire.

DRUG Trade.—By a gentleman, Registered, as Manager, Locum Tenens, or place of trust. Thoroughly experienced, town and country. Good Prescriber. References given. Disengaged. Hole, Westbury, Wilts.

J. MASON, Registered Chemist's Temporary Manager, Cranham St., Oxford, is disengaged. Terms 30s. per week, in-doors, with third-class railway fare to and fro. Good references.

AS Assistant. In-door. Age 24. Good references. London preferred. Omega, care of Mr. Baker, Langtoft, near Market Deeping.

AS Assistant. Out-door. 6 years' experience. Age 23. Excellent testimonials. Passed Preliminary, Oxford, and South Kensington examinations. Permanency. W. A. P., 30, Scarbro' Ter., York.

AS Manager or Assistant. In or out-door. Qualified. Over 15 years' varied experience. Good Dispenser and Prescriber. Can Extract Teeth. Now disengaged. Good references. Usual particulars to Nemo, Bank Cottage, Withington, near Hereford.

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LOCUM Tenens.—A reliable business man (Pharm. Chemist), being disengaged, seeks an engagement. Accustomed to town and country trade. Highest references. Alpha, 3, Bloomfield Ter., Royal Oak, London.

BY a steady Registered Chemist, age 37 years, height 5ft. 10in., an out-door situation, or to take the entire Management of a Branch. First-class references. P. H., care of Messrs. Compton & Son, Pharmaceutical Chemists, Margate.

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AS ASSISTANT. In London or suburbs preferred. Age 23. Minor and Hall. Good references. B. A., 417, Hackney Rd., E.

AS ASSISTANT in good class business. Town and country experience. Excellent references. Age 21. Height 6ft. A. B., 60, Lauriston Rd., South Hackney, N.E.

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A YOUNG MAN, of gentlemanly appearance, about 21 or 23 years of age. Good references and a knowledge of the seed trade required. To a suitable man a liberal and progressive salary will be given. Apply to WALTER GREGORY, Forc St., Wellington, Somerset.

AN ASSISTANT, for the Retail. Must be steady, active, and obliging, and thoroughly trustworthy, with good references. One seeking permanency preferred. Apply, with carte and usual particulars, to CHAS. H. RIDLEY, Wholesale Druggist, Maidstone.

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A JUNIOR ASSISTANT for a light Retail and Dispensing business. One able to Extract Teeth preferred. Duties light. Time for reading. Apply by letter, PHARMACY, Messrs. Sanger & Son, 489, Oxford St.

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AN active ASSISTANT, in-doors, not under 21, in a light Retail and Dispensing business, on the 4th prox. State age, height, salary, and all previous engagements, and enclose carte, which will be returned, or apply to D. THOMSON, Pharmaceutical Chemist, 137, Queen's Cres., Haverstock Hill, N.W.

A JUNIOR or IMPROVER in a good country Mixed business near London. Must be well recommended. Time for study if required. Apply, by letter, to K. M., Herrings & Co., 40, Aldersgate St.

DISPENSING ASSISTANT, with Minor qualification, and accustomed to first-class trade. Send carte, references, and usual particulars, to PALK & SMITH, 8, Strand, Torquay.

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THE Chemist and Druggist's BUSINESS successfully carried on for the last 24 years by the late Mr. John Moss, at 25, Market St., Chorley, and the goodwill and stock-in-trade thereof, are for immediate disposal. The turnover for the past 12 months has been over £1000. The rent is £50. For further particulars apply to the Exors., Mr. WM. WARD, Hosier, Deansgate, Manchester, or Mr. JOHN YATES, Ironmonger, Chorley.

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5. LONDON (Suburb).—Improving light Retail, Dispensing and PRESCRIBING. Returns about £500. Rent £30 per annum, on lease. Net profits nearly £300. Price £450. A bargain.

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No charge is made to purchasers.

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THE entire Fittings of a Chemist's Shop, comprising mahogany fronted Drawers, with shelving over, Window Enclosure, Counters, Wall Cases, Dispensing Screen, Counter Case, upright Case and Desk, Bottles, Jars, Carboys, suitable for a shop about 18ft. deep. £35. Can be seen fitted in place. E. NATALI, 207, Old Street.

20 FT. mahogany top Counter, £9; 20ft. mahogany front and top Counter, fitted with 20 drawers, £15; a 18ft. mahogany top ditto, £7; 8ft. ditto, ditto, fitted with 15 drawers the entire length, £6; 12ft. 6in. ditto, ditto, 24 drawers, £10; 5ft., 6ft., 7ft., 8ft. and 10ft. mahogany top Counters; a number mahogany top Cupboards; 16ft. Dispensing Counter, suitable for a dispensary, to fit against wall, fitted with sink, drawers and cupboards under, and shelving on top; a number of mahogany Nests of Drawers, 4ft., 6ft., 8ft., 10ft., 12ft., 16ft. long, with or without shelving over, glass knobs and bevelled edged labels. E. NATALI, 207, Old Street.

SPONGE Cases, fig. A 43, £5; fig. A 41, 65s.; Desk and Cases, fig. A 31, 65s.; fig. A 32, 45s.; a 10ft. 3in. bent Plate-glass Counter Case, brass frame, £9; a 9ft. 9in. ditto, ditto, mahogany frame, £8; 6ft. 6in. ditto, ditto, £7; 6ft. ditto, ditto, A 18, £7; 5ft. ditto, ditto, £6; 4ft. ditto, A 17, 90s.; 4ft. ditto, A 16, 80s.; 3ft. 6in., A 16, 70s.; 3ft. ditto, 60s.; 2ft. 6in. ditto, 50s.; 6ft. ditto, ditto, A 7, £7; 3ft., fig. A 8, 40s.; a large number of other Glass Counter Cases too numerous to mention in list; Plate-glass Dispensing Screens, 5ft. long, 6ft. long, 7ft. long, glass case at each end, with silvered glass centre, with marble slab in front, tablets on top, silvered glass backs inside cases, and fitted with movable shelves, very elaborate, £8 10s. each; a 8ft. Dispensing Screen, A 68; a ditto, ditto, 5ft. 9in.; Dispensing Screens, A 55, 5ft. long, £6; 6ft. long, £7; 4ft. 6in. long, with silvered plate-glass back inside, £7. E. NATALI, 207, Old Street, London, E.C.

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MANCHESTER (Suburb).—Well known light Retail and DISPENSING, at full prices. Commanding corner shop. Good house. Returns £950. Good appointment. To a man with good references very favourable terms of payment will be accepted. Price about one year's returns.

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Terms for Advertisements may be had on application to the Publishers, Messrs. J. & A. CHURCHILL, 11, New Burlington Street, W. Those for Businesses for Disposal, &c., &c., will be found on page xix.

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3. LONDON, N. (main road).—Good class Retail and DISPENSING. Returns over £500 yearly, under management. Post Office attached. Handsomely fitted shop. Terms will be made easy to an immediate purchaser.
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6. INLAND WATERING PLACE.—Good class Retail and DISPENSING. Returns nearly £400. Handsomely fitted shop, and in good position. Price to be arranged.
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THE complete STOCK and FITTINGS of a Chemist's shop, comprising Counters, Cases, Drawers, Bottles, Ointment, Extract, Honey, and Leech Jars, Carboys, Scales, Specie Jars, Desk, Lamp, &c. LINDEN, Broughton, Winchester.

NEW IMPROVEMENTS IN PHARMACY.

THE BURROUGHS INHALER

"Is an ingenious and convenient device for inhaling chloride of ammonium fumes; by its use the chloride of ammonium is brought in more intimate contact with the mucous surfaces of the passages of the nose and throat than by any other form of inhaler."—*The Medical Press and Circular* Reports.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

KEPLER EXTRACT OF MALT.

The Lancet says of the Kepler Extract of Malt: "The best known, and in this country the largest used, Extract of Malt. It is as distinct an advance in therapeutics as was the introduction of cod-liver oil. It is one of our best remedies for atonic dyspepsia, and is undoubtedly useful in consumption and other wasting diseases." And further adds, "It is very good, and may be used with confidence."

For wasting diseases.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

McK. & R. CAPSULED PILLS.

An important improvement has been made, which now renders the most offensive and repulsive drugs easy of administration. This improvement consists in perfectly sealing with a thin transparent capsule of gelatine all drugs, such as quinine, morphia, rhubarb, &c., also the various pills and powders of the Pharmacopœia. These capsules are of an ovoid shape, and it has been demonstrated beyond question that when ordinary coated pills are rejected by patients there is not the slightest difficulty in administering this new form.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

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This is an emulsified combination of the purest fresh Norwegian Cod Liver Oil with 50 per cent. of Extract of Malt (Kepler).

So combined, the oil is sub-divided into minute particles which can be seen under the microscope to be as fine as the granules of milk; and so much finer than any that can be obtained by any emulsion with gums. On the fineness of the emulsion depends the digestibility of the oil. "The digestive change undergone by fatty matters in the small intestine consists mainly in their reduction into a state of emulsion, or division into infinitely minute particles."

For full Notes and Reports see front pages of *The Lancet*, May 6th.

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"This is a really valuable preparation, and, as far as we know, a novelty. It contains beef-juice and citrate of iron in solution in wine, and is therefore a very powerful and rapidly-acting tonic. Children, as well as adults, take it easily; and, as its taste is by no means unpleasant, it can hardly fail to attain great popularity. In many cases of scrofula and rickets we have given it with the most gratifying results."—*The Lancet* Report.

For full Notes and Reports see front pages of *The Lancet*, May 6th.

LAWTON'S ABSORBENT COTTON

"Has been pronounced by some of our most eminent surgeons the very best absorbent for taking up discharges; it is very fine and soft, and acts instantly."—*The Medical Press and Circular.*

For full Notes and Reports see front pages of *The Lancet*, May 6th.

THE WYETH COMPRESSED TABLETS

EXACT SIZE OF TABLET.

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For full Notes and Reports see front pages of *The Lancet*, May 6th.

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The Medical Press and Circular reports:—"Hazeline is a valuable astringent remedy, wonderfully efficacious in checking *internal* or *external hæmorrhages*, and for *allaying inflammation.* It is particularly valuable in the treatment of *bleeding piles*, and as a *surgical dressing* it deserves attention."

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The following formulæ and combinations embrace all those in general request. Others will be added as the demands of the profession warrant.

We claim for the Wyeth Hypodermic Tablets:

Absolute Accuracy of Dose.
Ready and Entire Solubility.
Perfect Preservation of the Drug.

Their convenience and utility will at once be apparent on examination.

Morphiæ Sulphas ....1-3 grain.	Morphiæ Sulphas ....1-8 grain.
Morphiæ Sulphas ....1-4 grain.	Atropiæ Sulphas .... 1-200 grain.
Morphiæ Sulphas ....1-6 grain.	Morphiæ Sulphas ....1-12 grain.
Morphiæ Sulphas ....1-8 grain.	Atropiæ Sulphas ....1-250 grain.
Morphiæ Sulphas ....1-12 grain.	Atropiæ Sulphas ....1-60 grain.
Morphiæ Sulphas ....1-3 grain.	Atropiæ Sulphas ....1-100 grain.
Atropiæ Sulphas ....1-120 grain.	Atropiæ Sulphas ....1-150 grain.
Morphiæ Sulphas ....1-4 grain.	Strychniæ Sulphas ..1-60 grain.
Atropiæ Sulphas ....1-150 grain.	Strychniæ Sulphas ..1-100 grain.
Morphiæ Sulphas ....1-6 grain.	Strychniæ Sulphas ..1-150 grain.
Atropiæ Sulphas ....1-180 grain.	

For full Notes and Reports see front pages of *The Lancet*, May 6th.

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1. It is easily administered, the dose being very small.
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3. It does not irritate the stomach.
4. It has no effect on the bowels, producing neither constipation nor diarrhœa.
5. It does not blacken the teeth.

In ordering please specify Fer. Wyeth 3 oz. with Dropper.

NOTE.

All the articles mentioned on this page may be obtained from respectable Dispensing Chemists and Wholesale Druggists in every part of the world, or from the European Depôt of Burroughs, Wellcome & Co., 7, Snow Hill, London, E.C. Our new Formulæ Book and Trial Specimens of any of our Preparations will be sent to any Member of the Profession upon request.

BURROUGHS, WELLCOME & CO., Manufacturing Chemists, 7, Snow Hill, London, E.C.

London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill, 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 649.] SATURDAY, DECEMBER 2, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, December 6th, 1882, at Eight o'clock.

The Chair will be taken at half-past Eight, *precisely*.

The following papers will be read:—

"The Crystalline Constituent of Jafferabad Aloes." By W. A. SHENSTONE.

"The Sale by Public Auction of Spurious and Worthless Drugs." By E. M. HOLMES.

"Further Observations on Arsenic." By W. A. H. NAYLOR and J. O. BRAITHWAITE.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.

October 4th, 1882.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and

£35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
Half-a-guinea	FIVE Votes
One Guinea	TEN Votes.
And to increase in the same proportion.	
Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas	TEN Votes for life.
And to increase in the same proportion.	

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or in the case of a widow, her husband) may have contributed.

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

THE SCHOOL OF PHARMACY

Of the Pharmaceutical Society of Great Britain.

LECTURES.

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On Monday, Tuesday, and Wednesday Mornings, from 9 till half-past 10 o'clock.

FEES.	£ s. d.
One Course (five months)	3 3 0
An entire Session (two Courses)	4 4 0
Perpetual admission	5 5 0

There are Two of these Courses during the Session, the Course which commences in October and ends in February being repeated in the following five months.

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By PROFESSOR BENTLEY.

On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

FEES.	£ s. d.
Botany and Materia Medica, one Course (five months)	2 2 0
An entire Session (two Courses) including Systematic and Practical Botany	3 3 0
Systematic and Practical Botany, separately	1 1 0
Perpetual admission to all the Courses	4 4 0

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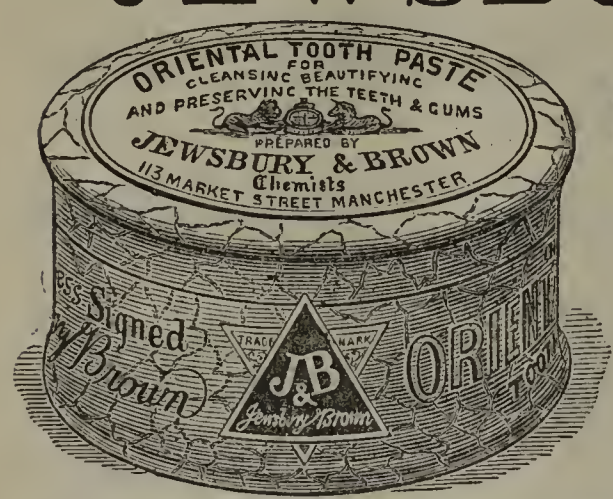

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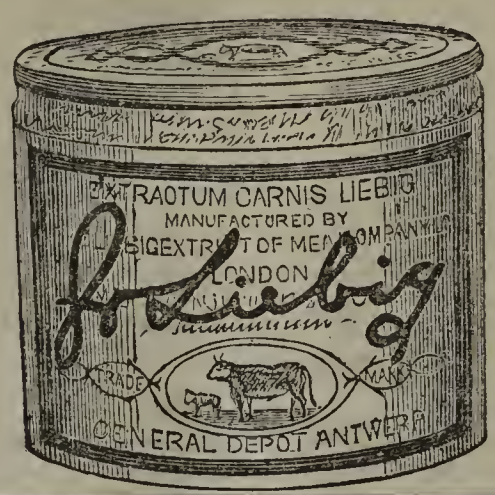

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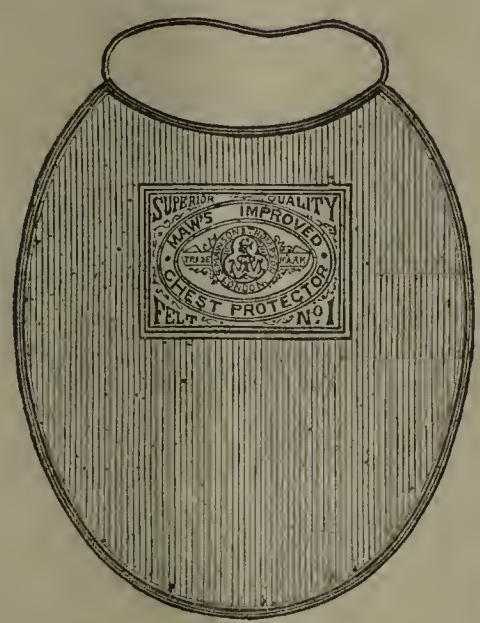

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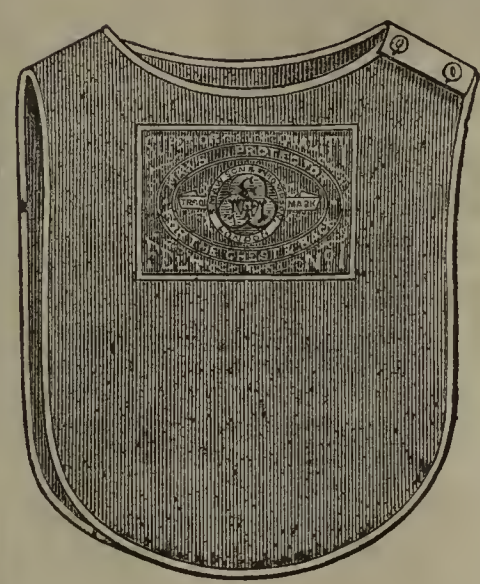

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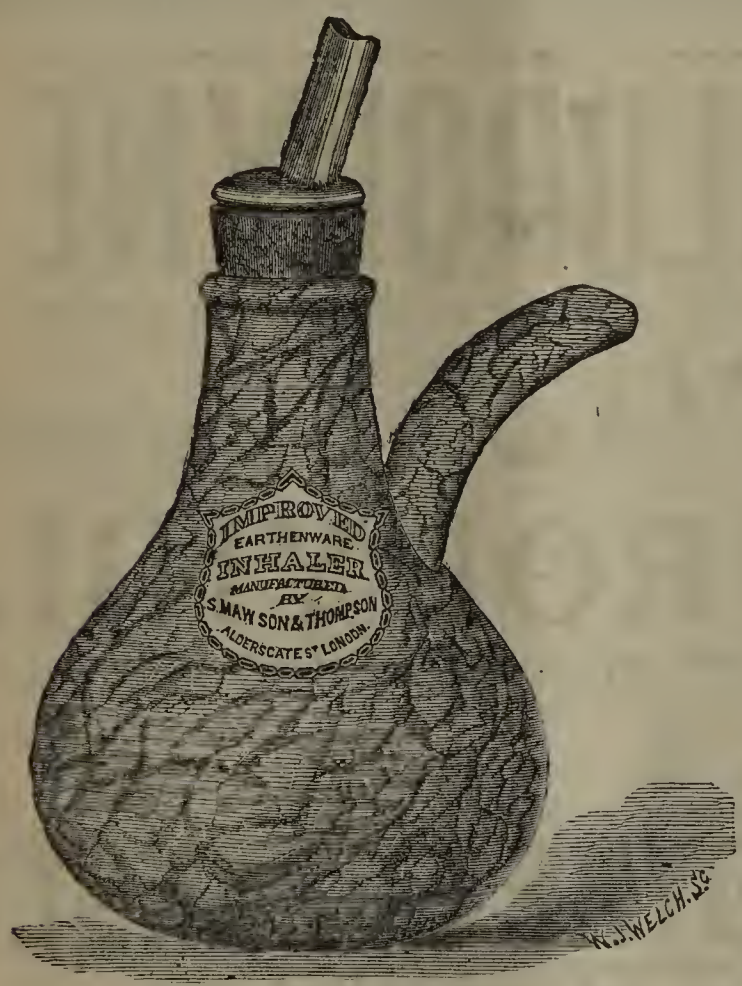

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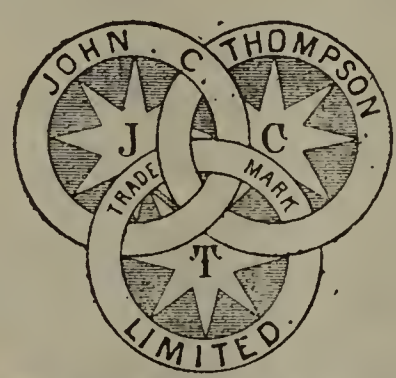

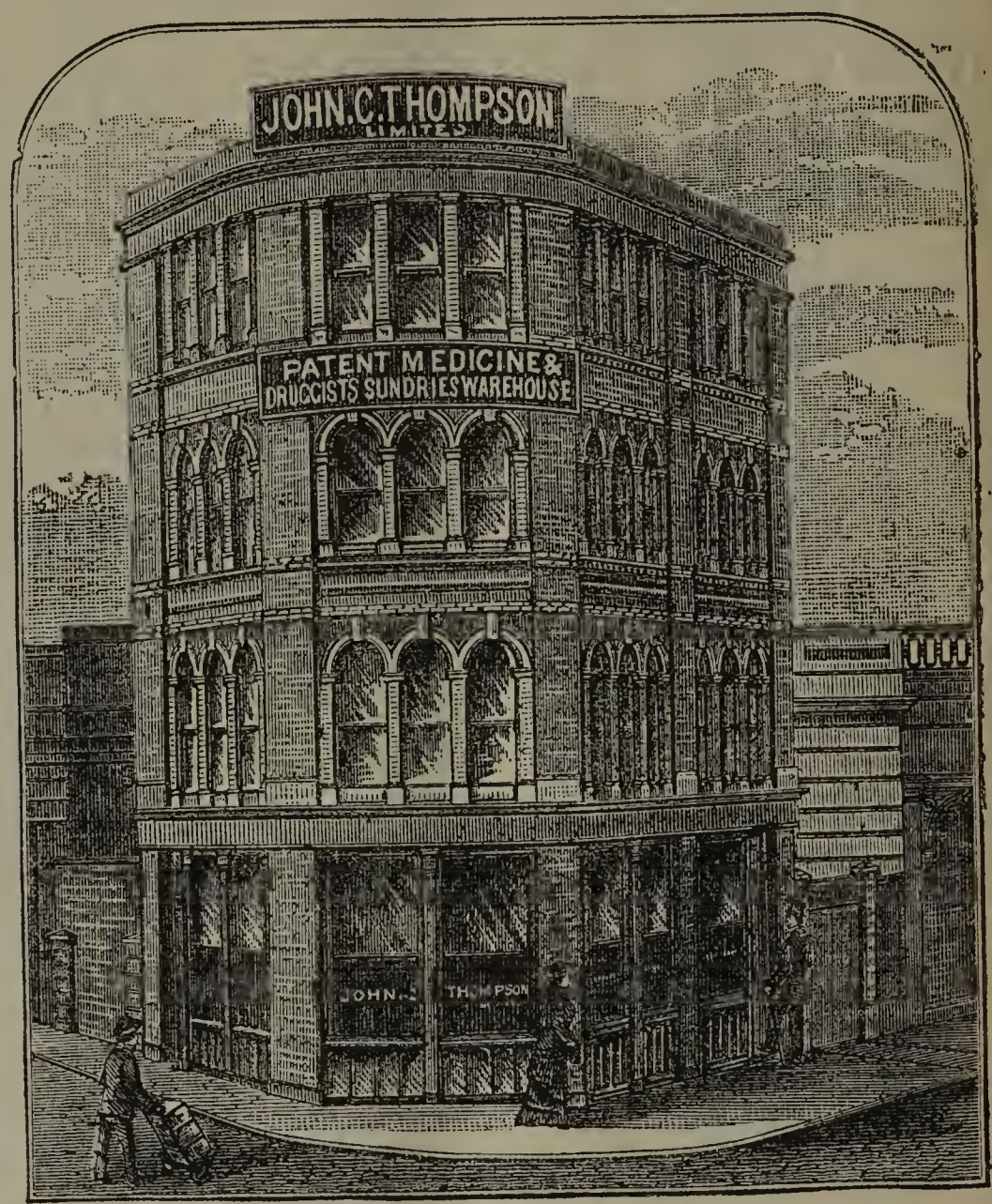

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"THE MONTH."

The weather, with the exception of a few frosty nights, has been so favourable to vegetation during the past month, at all events in the south of England, that many of our spring flowers may be found in blossom. Kentish primroses are being sold in the London streets, whilst an Isle of Wight correspondent forwards the red poppy, the winter heliotrope (*Petasites fragrans*), and the *Lamium album* in flower, and states that the primroses are in blossom, the hazel catkins are budding, and the *Daphne Laureola* is almost in flower.

On the rockwork at Kew, *Gentiana Kurroo* is now in flower and also *Erigeron philadelphicum*. In the Economic House, *Monodora myristica*, or Calabash nutmeg, is in full bloom.

In the Economic House at Kew may also be seen a specimen of the "tonga" plant. According to Mr. N. E. Brown, who has just described the "tonga" plant in detail (*Journ. Bot.*, Nov., p. 332) it must now pass under the name of *Epipremnum mirabile*, Schott, instead of *Rhaphidophora vitiensis*, the supposed two plants having proved to be identical and the former name having been given to the plant fifteen years before the latter. It would appear that it is by no means confined to Fiji, but has been found in Java, Baly, Amboina, Timor, and Tropical Australia. It has been some time in cultivation in this country, having been grown by Mr. W. Bull. The youngest leaves are entire, but the subsequent leaves are divided on the left and right hand side alternately, both sides finally becoming divided and forming a pinnatifid leaf.

In the same Journal, it is stated that a very rare British plant, *Eriophorum gracile*, has been found by Mr. Bolton King, in three bogs in the New Forest within a range of about two miles. A yellow-fruited variety of *Rubus discolor*, which does not appear to have been recorded as British since the time of Bobart, in 1696, has been detected by Mr. J. W. White, near the Mendip Hills.

The *Gardeners' Chronicle* (p. 566) records two curious facts which, although they have no apparent bearing on pharmacy, yet may lead to valuable results. One is the successful attempt to graft potato tubers and so form hybrids. As the potato is an underground stem, this is something like the grafting of cinchonas, which also promises good results. The other fact is the development of a variety of the apple, without any core. How this was produced is not stated, but it is known that pears having a similar character are sometimes produced by a plentiful supply of moisture being suddenly given to the tree after a long drought and while the pears are in course of formation.

An interesting account of the effects of the stinging tree, *Laportea gigas*, is given in the same journal (p. 567), by Mr. N. E. Brown. The pain produced by the sting of a single hair on the right hand gave rise to remarkable symptoms, the pain being confined to the right side of the body and being succeeded by a numbness and slight paralysis. Besides the pain, a sensation of losing the senses, or rather, of becoming insane, was experienced. The severe symptoms lasted two hours; the spot pricked remaining constantly painful for nearly a month after being stung. Mr. Brown expresses surprise at the fact that the pain extended to the right side of the brain instead of the left, it being generally received that the right side of the brain governs the left half of the body. Dr. Ferrier, in *Brain* for October, mentions a singular condition in which impressions on one half of the body are referred to the corresponding point on the opposite side, a phenomenon termed "allochiria" by Obeisteiner; and considering the effect of *Laportea* on the brain, as described by Mr. Brown, this may be a further illustration of the same phenomenon (*Lancet*, p. 709). As the liquor injected could not have been more than the dot over an *i*, such a virulent poison could not possibly be used in medicine except in a homœopathic dose; but the chemical nature of the substance is deserving of investigation, if only to discover an antidote for its effects. Mr. A. W. Bennett has recently, in this Journal, called in question the common statement concerning the nettle owing its stinging property to formic acid, and suggested that the irritant is more probably of an alkaline nature.

According to M. Maumené (*Comptes Rendus*, xcv., 924), the colouring matter of black grapes and of red wines, to which he has given the name of "œnocyanine" is colourless during eight to twelve days before its complete formation. He finds that if a green grape be taken from a bunch in which some are already turning red, and dried over strong sulphuric acid, the seeds when quite dry become yellowish, but that in a few minutes after their removal from the bell-glass they rapidly absorb oxygen and atmospheric moisture and can be seen to darken in a few minutes to the natural colour that they would have in the ripe grape. He therefore concludes that iron has nothing to do with the coloration.

The purple-red colouring matter of the fungus *Agaricus ruber* (*A. sanguineus*) has been examined by Dr. T. L. Phipson, who proposes to name it "ruberine" (*Chem. News*, Nov. 3, p. 199). It is described as soluble in water and in alcohol, the solution being of a beautiful rose-red colour when seen by transmitted light, but presenting a very vivid blue fluorescence, and giving in its spectrum two dark absorption bands in the green. In these latter characters it differs from "palmelline," the colouring matter obtained by Dr. Phipson from *Palmella cruenta*, a solution of which is also rose-red by transmitted light, but presents an intense yellow fluorescence and shows dark absorption bands in the yellow part of the spectrum. Dr. Phipson has also separated from the peeled fungus a substance, which he considers to be an alkaloid, and which he proposes to name "agarythrine." From a solution in ether it was deposited upon evaporation as a white or yellowish-white amorphous substance, soluble in alcohol, ether, and dilute hydrochloric acid, and having a distinctly bitter taste, followed by a burning sensation on the tongue. When treated with nitric acid, or oxidized by contact with air, the solution acquired a rose-red colour, and for this and other reasons Dr. Phipson thinks that the colouring matter, "ruberine," is derived from the alkaloidal substance, "agarythrine," under the influence of the air and solar rays. It may be presumed that the fungus referred to is the *Russula rubra*, Fr. (Cooke's 'Handbook'), that species being bitter, whereas *R. sanguinea* is not. Red colouring matter occurs also in several other species.

A contribution to the settlement of the question as to how far the vital processes of plants are influenced by various mineral compounds presented by

the soil to their roots has been made by Mr. F. C. Phillips (*Chem. News*, Nov. 17, p. 224), who has carried out a number of experiments with geraniums, coleuses, ageratums, achyranthes and pansies, planted in soils containing one-half per cent. of carbonate of zinc, copper or lead, or arsenate of lime. The most strongly marked effect was observed to be produced by the arsenate of lime, and from the general results Mr. Phillips concludes (1) that healthy plants grown under favourable conditions may absorb through their roots small quantities of lead, zinc, copper and arsenic; (2) that lead and zinc may enter the tissues in this way without causing any disturbance in the growth, nutrition and functions of the plant; and (3) that compounds of copper and arsenic exert a distinctly poisonous influence, tending, when present in larger quantity, to check the formation of roots, and either killing the plant or so far reducing its vitality as to interfere with nutrition and growth. It will be obvious that these conclusions have an important practical bearing upon the extensive use of Paris green (arsenite of copper) as an agricultural insecticide in the United States.

A further contribution to the knowledge of the conditions attending the reduction of nitrates in soils under the influence of a ferment has been made by Messrs. Dehérain and Maquenne (*Comptes Rendus*, xcv., 854). When the fermentation was provoked artificially by adding solution of sugar and potassium nitrate to garden soil, multitudes of vibrios could be seen, with the aid of a microscope, presenting all the characters of *Bacillus amylobacter*, the "butyric ferment" of Pasteur. The composition of the gas evolved differed with the rate of fermentation. When this was slack it was found to consist of CO_2, 80·5; NO, 8·2; N, 11·3; and when more energetic of CO_2, 67·3; H, 31·5; N, 1·2. The butyric ferment obtained from other sources was found to act similarly; but when the lactic fermentation was set up alone no reduction of nitrates was effected. The authors think that the hydrogen produced by the butyric fermentation has the same action upon nitric acid as nascent hydrogen is known to have.

M. Marcano, who recently pointed out the intervention of microbes in the fermentation of an Indian beverage prepared from ungerminated maize (see before, p. 184) has been extending his observations in other directions. His results appear to confirm the opinion previously expressed that under the influence of a micro-organism, which occurs under the three forms of vibrios, spores and mycelial tubes, and is easily detected on the pellicle of maize and other grains, starch is converted into dextrin, sugar, and afterwards alcohol, apart from the action of any diastatic ferment emanating from the vegetable cells. There appears, however, to be a considerable quantity of diastase formed as "a product of the vital activity of the vibrios," for when the microbes were cultivated for a time under favourable conditions in a mixture of ungelatinized starch and water, containing some albumen, and then rendered inert by the action of chloroform, it was found that the liquid in which the action had been going on possessed, after filtration, a diastatic action equal to good extract of malt. The same microbe is said to be the cause of the fermentation of cane juice during the manufacture of sugar, and to be easily detected in the cells of the stalks. It is also capable of fermenting lactose, and this property may be utilized in the preparation of koumiss, by sowing the microbes in lukewarm milk, to which lactose has been added in proportion to the alcoholic strength desired. The fermentation goes on very actively, and even tumultuously, at the ordinary temperature, for eight or ten hours, or until all the sugar is transformed, and the sourish tasted alcoholic liquor produced contains a large proportion of diastase.

Some comparative experiments, made by Dr. W. Detmer, of the University of Jena (*Zeits. f. phys. Chem.*, vii., 1), appear to show that the action of the diastatic ferment upon starch is considerably accelerated when it takes place in an atmosphere of carbonic acid. A similar result has been found to follow the addition of minute quantities of citric, phosphoric and nitric acids to the liquid containing the starch and ferment, the activity increasing with the proportion of acid added up to a certain point, which being exceeded the action was again proportionally retarded. On the other hand, when the liquid was made extremely faintly alkaline the breaking up of the starch went on very slowly, and when made more alkaline it completely stopped. The formation of sugar was not much interfered with by the presence of even relatively large quantities of carbolic acid.

Fehleison has found that in erysipelas micrococci are constantly present in the lymphatic vessels of the skin (*Lancet*, Nov. 4, p. 771). When cultivated in gelatine prepared by Koch's method they were found to grow rapidly, and the fourth generation of these organisms was capable of producing the disease when inoculated into the skin of human beings.

In the *British Medical Journal* (Nov. 25, p. 1051), attention has been directed to the use of naphthalin. It appears that in Strassburg it has been used for dressing wounds as an antiseptic, all animal or vegetable micro-organisms being destroyed by it, whilst neither wounded surfaces nor the healthy structures around them are in the least irritated. It has also been used for the disinfection of sick rooms and closets, as a parasiticide in certain skin diseases, and as an inhalation in infectious diseases involving the respiratory organs, such as diphtheria. The crystals have the disadvantage of cutting the flesh by their sharp edges, when applied to wounds. Naphthalin is soluble in various fixed oils, in cold ether and in warm alcohol, but not in dilute acids or alkalies.

At a recent meeting of the Medical Society of London, Dr. Richardson read a paper on the properties of ammonia, chloroform, and ammoniated chloroform, as antiseptics (*Lancet*, Nov. 25, p. 892). He also exhibited two small specimens of lung, which had been preserved in chloroform vapour and had remained untouched in their respective bottles for thirty-five years, and were still well preserved. As an illustration of the antiseptic power of ammonia vapour, he showed a specimen of blood which had been drawn from a sheep's neck in April, 1862, and kept in a well-corked bottle ever since; it was still perfectly fresh and fluid. He found that structures containing much fat became saponified unless chloroform were mixed with the ammonia, and that when it was desirable to retain the colour of the blood, the addition to the chloroform of coal gas which contained sufficient

carbonic oxide for the purpose was entirely successful. The knowledge that it is possible to retain specimens of viscera in a perfectly sound state, during a long investigation, in ammonia or chloroform vapour, will be welcome to analysts and toxicologists. Dr. Richardson remarked that he feared the process could not be carried out on the large scale. He added that he had found that chloride of zinc and spirit embalmed a body perfectly but made it too hard for dissection.

Dr. Von Mering has recently been investigating the physiological properties of acetal (*Med. Times and Gaz.*, Nov. 11, p. 585, from *Berliner klin. Woch.*). He finds that it causes gradual loss of consciousness and then stops the respiration before arresting the action of the heart. In experiments upon frogs, rabbits, dogs and cats, it was found that when death occurred from its use it resulted from apnœa caused by paralysis of the respiratory muscles. Eight experiments have been made with men, in six of these there was a notable effect both in the relief of pain and in the procuring of sleep. The author points out the remarkable fact that such bodies as alcohol, ether, paraldehyde, acetal and several other bodies not containing chlorine, act primarily and more powerfully on the respiratory centre, whilst chloral, chloroform, and bichloride of methylene affect the circulation and respiration in almost an equal degree.

In the *British Medical Journal* (Nov. 11, p. 934), an account is published of Dr. W. Squire's further inquiries into the action of bromide of ethyl. He remarks that the safety of anæsthetics depends in some measure upon the readiness with which they are cleared from the lungs by ordinary diffusion, the rate of diffusion depending upon the vapour density. Thus nitrous oxide of density, 1·5, and ether, 2·56, allow of more rapid return to consciousness than bromic ether, the vapour density of which is 3·75 or chloroform, which has that of 4·2. Bromic ether, however, possesses the valuable property of acting as an anodyne without causing complete unconsciousness and hence can be used to allay labour pains, the vapour being diffused from the lungs during the intervals of pain. For the relief of spasmodic affections, such as whooping cough and angina pectoris, a solution of 1 part of bromic ether in 200 parts of water could be given. Dr. Squire considers that far too large a proportion of anæsthetics is generally used, a less amount, more largely diluted, being quite as successful and much safer. In the discussion on the paper, Dr. Spanton remarked, concerning the use of bromide of ethyl as a local anæsthetic, that when used in the form of spray insensibility of the skin can be produced by it without causing actual freezing, as is necessary when ether vapour is applied, and hence the tissues can be cut while still soft and the subsequent pain of thawing is entirely avoided. He also remarked that he had found the inhalation of small quantities of great service in some cases of asthma supervening on old standing bronchitis.

Another new test for albumen, which promises to prove a very convenient one, has been described by Dr. George Johnson (*Lancet*, Nov. 4, p. 737). It depends upon the application of an observation published by his son in 1874 (*Jour. Chem. Soc.*, Aug.) that albumen is coagulated by picric acid. It has been found that when albuminous urine is treated with an equal volume of saturated solution of picric acid it immediately becomes turbid with coagulated albumen. This test is said to be even more delicate than the nitric acid test, while the coagulum produced is about equally insoluble in water; but the coagulum is readily soluble in caustic potash and ammonia, so that an alkaline urine should be neutralized before applying the test. A small crystal or powder of picric acid quickly dissolves and produces the same effect in the urine, and Dr. Johnson suggests that a few crystals in a bottle, or, better still, solid pellets made of the powder, would be much preferable to nitric acid as a portable test.

Subsequent to the above communication, Dr. Johnson announced (*Lancet*, Nov. 18 and 25, pp. 869 and 898) that picric acid also furnishes a very valuable test for grape sugar, by increasing to an extraordinary degree the delicacy of Moore's test for sugar in urine, *i.e.*, boiling it with an equal volume of liquor potassæ. In order to prevent the obscuration of the test by the intensity of colour produced, a weak solution of potash, not exceeding 2 per cent., must be used, and only enough picric acid that the picrate of potash formed shall tinge the liquid yellow. Upon boiling this alkaline solution of picrate of potash with a liquid containing grape sugar, an intense deepening of colour takes place immediately, and so delicate is the reaction that it is reported to indicate that a trace of grape sugar is present in all normal urine. The reaction does not occur when only cane sugar is present.

Very contradictory statements have been made as to the behaviour of hydrated calcium chloride when submitted to a temperature of from 180° to 200° C. According to Mitscherlich the compound containing 6 molecules of water ($CaCl_2+6H_2O$) loses 4 molecules only at 200° C., whilst according to Legrand calcium chloride in aqueous solution, boiling at 179·4° C., already contains less than 2 molecules. To clear up this point Herr Weber has heated pure hydrated calcium chloride ($CaCl_2+6H_2O$) to 200° C., and he reports (*Berichte*, xiv., 2316) that at that temperature it becomes practically anhydrous, losing not more than another $\frac{1}{4}$ per cent. in weight when fused. The product forms a porous mass, very suitable for drying purposes; it has an alkaline reaction, probably through loss of hydrochloric acid and formation of oxychloride, but the alkalinity is greatly increased by fusing.

About eighteen months since Dr. Hofmann communicated the results of some experiments (*Berichte*, xiv., 705) from which it appeared that the true formula for coniine was $C_8H_{17}N$, instead of $C_8H_{15}N$, by which its composition had hitherto been expressed. Assuming this to be correct it became evident that a revision was necessary of the published statements with respect to conydrine, the other base discovered in conium by Wertheim, which had been represented to be a hydrate of coniine ($C_8H_{17}NO$) from which a molecule of water was removable by treatment with phosphoric anhydride, leaving a base that was identical with coniine; for either the formula for this base also would have to be increased by H_2, or the decomposition could not be so simple as had been stated. Dr. Hofmann therefore made some analyses (*Berichte*, xiv., 2313) of purified conydrine, which agreed in indicating that Wertheim's formula, $C_8H_{17}NO$, represents the proper proportion of hydrogen present in the base. Further, upon treatment of the same substance with phosphori-

anhydride a strongly basic volatile oil was obtained, which though it had the smell of coniine, proved on nearer examination to be a mixture of various bodies, requiring further investigation to clear up their composition.

"Kairine" and "kairoline" are the names of two synthetically prepared bases which form the latest additions to the already large number of substances put forward as possible substitutes of quinine. They are said (*Pharm. Zeitung*, No. 89) to be two out of many similar bodies, prepared by Dr. O. Fischer and Dr. W. Königs, whose investigations in connection with the alkaloids are well known. In the belief that the characteristic properties of quinine are not referable to a chinoline nucleus, as has been assumed, but to a hydrogenized chinoline nucleus, and keeping in view the presence of oxygen in quinine, Dr. Fischer worked in the direction of preparing compounds in which hydrogen was introduced into chinoline in the form of hydroxyl or other oxygen-containing groups, whilst Dr. Königs prepared compounds by the introduction of molecules free from oxygen. After a large number of different compounds had been prepared they were entrusted for therapeutical experiment to Dr. W. Filehne, of Erlangen, who found that the power of reducing the temperature in fevers is possessed by those compounds in which the nitrogen atom, besides its combination with two atoms of carbon in the chinoline ring, is joined to the carbon of a methyl or other alcohol group. This condition is present in three known compounds, Dr. Fischer's oxychinolinmethylhydride, which has received the more convenient name of "kairine," Dr. König's "chinolinmethylhydride," similarly named "kairoline," and Wischnegradzky's analogous "chinolinethylhydride." The last two appear to be at present put out of court by difficulties attending their preparation and their disagreeable taste. Kairine, represented by the formula $C_{10}H_{13}NO$ (that of chinoline being C_9H_7N), is represented as forming a hydrochlorate which is a crystalline powder, not quite white (greyish-yellow), easily soluble in water, and having a mixed saline bitter and aromatic taste, the latter similar to guaiacol, but not burning. Upon healthy powerful full-grown persons doses of 1 to 1·5 gram are said to be without physiological action and produce no disagreeable effects; but upon full-grown invalids, or weakly persons, a dose of 1 gram every two hours must not be exceeded, or cyanotic symptoms may result. The dose recommended in cases of fever in adults is 0·3 to 0·5 gram at intervals of not more than an hour or an hour and a half.

The attention of several pharmacists in Germany and Austria has been directed recently to working out a satisfactory method of preparing quinine tannate, one of the slowly soluble, and therefore nearly tasteless, compounds of that alkaloid. Herr Dukla (*Pharm. Zeitung*, No. 92) recommends to suspend 20 parts of quinine sulphate in 80 parts of distilled water, add about 20 parts of dilute sulphuric acid so as to completely dissolve the quinine, then dilute with sufficient distilled water to bring the entire quantity up to 1000 parts and add to the filtered solution, under diligent stirring, a solution of 40 parts of sodium carbonate in 160 parts of water. The resulting precipitate of quinine hydrate is to be collected on a filter, washed well in cold distilled water, allowed to drain, and then dissolved whilst moist in 200 parts of 96 per cent. alcohol. The alcoholic solution is filtered, and allowed ot trickle, under constant stirring, into a clear solution of 60 parts of tannic acid in 1000 of water, prepared in the cold, the mixture being occasionally stirred during some hours after and then allowed to settle. The abundant nearly white precipitate should be collected on a moistened paper filter, washed with distilled water at 30° C. until the water running off no longer has an astringent taste, dried on blotting paper at a temperature not exceeding 30° C., and rubbed to a powder. The neutral tannate of quinine thus obtained is described as nearly white, and entirely without odour or taste.

Dr. T. Browne, of Yarmouth, has published, in the *Brit. Med. Journ.* (Nov. 25, p. 1030), the results of his experiments upon the therapeutic value of hyoscyamine. He used in his experiments Merck's crystalline hyoscyamine, and arrived at the following conclusions concerning its use: That the action of hyoscyamine when given by the mouth is very uncertain and dangerous; that no curative action could be claimed for it, although it proved capable of moderating, in maniacs, violence of action and of soothing without causing sleep; that hypodermic injection was the only safe method of using the drug. The following formula was the one which was employed, but while satisfactory as regards strength, it was found to lack stability.

Hyoscyamine (Merck's crystallized) .	4 grains.
Glycerine and distilled water, of each	½ ounce.
Carbolic acid	2 minims.

Dissolve without heat.

Of this solution 4 to 8 minims are injected hypodermically. Dr. Browne states that it is very important to make the solution without heat, as heat renders the alkaloid nearly inert. He finds that the strength of any solution yet devised cannot be depended on for more than a month.

Dr. Chahbazian, of Paris, has recently been experimenting with Tanret's ergotinine (*Med. Times and Gazette*, Nov. 18, p. 624). He finds it to act more quickly than the so-called ergotine (watery extract) and that it does not cause local abscesses or indurations. The strength used for hypodermic injection was 5 to 10 minims of a solution of $\frac{1}{50}$th of a grain in 20 minims. Ergotinine is soluble in alcohol or chloroform, and insoluble in water; but the solvent used in the experiments is not stated. The activity of this alkaloid should be very great, seeing that only 3 grains are obtained from 1 lb. of ergot.

A case of strychnia poisoning is reported (*Lancet*, Oct. 28, p. 724), in which the symptoms were delayed by the action of laudanum taken at the same time. The doctor who attended it hints that opium might be used when chloral is not at hand. Except in the eastern counties (the case happened in Lincolnshire) laudanum is not more likely to be at hand than chloral, whereas tobacco, mentioned by Dr. Neligan as an antidote to strychnia, is almost always to be obtained easily and quickly.

Mr. J. D. Forbes has recently examined the potato beetle, *Doryphora decemlineata*, and finds that it contains a vesicating principle, which he has extracted in the form of a dark oily fluid; but no evidence of the presence of cantharidin has been detected (*Amer. Journ. Pharm.*, [4], xii., 550).

The *Lancet* (Oct. 28, p. 716) directs attention to a new styptic, which was discovered during the French expedition to Mexico. This remedy is a

plant named *Tradescantia erecta*, which in a crushed or chewed state is said to possess the property of stopping any hæmorrhage, its action exceeding that of all styptics as yet known, as for example, perchloride of iron. A specimen was planted by the discoverer at Versailles, in 1867, and is said to retain its properties unimpaired by the difference of climate. This plant belongs to a natural order *Commelynaceæ*, remarkable rather for the mucilaginous than for the medicinal character of its members.

In the *Practitioner* (November, p. 327), Dr. Murrell gives an account of the action of white agaric (*Polyporus officinalis*) in the sweating of phthisis. After numerous experiments he has arrived at the conclusion that it is a good remedy, and that there are times when it may be used with advantage; but he much doubts if it is equal to atropia, picrotoxin, pilocarpine or Dover's powder. In small doses it is uncertain in its action, whilst in large doses it purges violently. The agaric was given in doses of 3 grains up to 30. The drug in 3 grain doses acted slowly, and not with certainty, 3 grains of extract, equal to 9 grains of the powder, acting better; whilst 30 grains purged violently. A tincture 1 in 6 and a fluid extract 1 in 3 have also been prepared. The active principle, agaricine, has been given in the dose of $\frac{1}{12}$ of a grain and was found to check cough and to promote sleep as well as to restrain sweating.

An "emplastrum impermeabile russicum" is being introduced upon the continent which is said to be likely to throw English plaster into the shade. It is described (*Pharm. Zeitung*, No. 89) as a white enamel-like ribbed membrane, made adhesive on one side by a coat of isinglass. A sample examined by Herr Dietrich was found, after removal of the isinglass, to dissolve in ether-alcohol to collodion, with a separation of a white powder which was recognized as zinc oxide. The collodion shaken with chloroform yielded a thick oily residue which proved to be castor oil. Herr Dietrich therefore thinks the probable method of making the plaster is to use a flexible collodion containing sufficient castor oil to bind some zinc oxide, afterwards to add collodion, and then to dip glass plates into this mixture two or three times, or until a sufficiently thick membrane has been deposited upon them; to this a coat of strong solution of isinglass is given, and the plaster, when dry, can be removed from the glass.

Some further information concerning the production of opium in the Zambesi district (see *Pharm. Journ.*, [3], viii., 1007; ix., 63) has been given by M. Guyot (*Comptes Rendus*, xcv., 798), who recently visited the locality. The cultivation, which is carried on at Chaïma, lying between the Muto and Quaqua rivers, was commenced in 1879, and now occupies about three hundred labourers. The collection of opium is effected about seventy-five days after the sowing of the poppy seed, and the yield appears to compare favourably with that usual in India. The product, in its viscous condition, is said to exhale an odour *sui generis*, but no particulars are given as to its average morphia strength; indeed the whole of it is stated to be sophisticated on the spot by the addition of 80 to 100 per cent. of a special matter the composition of which is known only to the European cultivators. The mixture is made up into balls weighing about 500 grams, which are packed in boxes at the bottom of which is a bed of powdered empty capsules and poppy leaves covered over with a layer of indigenous cotton. After the collection of the opium the capsules are allowed to completely ripen and then gathered for the sake of the seed.

According to a 'Commercial Report,' issued by Messrs. Sachsse and Co., several of the largest producers of citronelle oil have given up its production in favour of coffee cultivation, and the price is consequently expected to be higher. Lavender is said to have yielded a larger harvest than last year, and this has brought about a decline in price. The peppermint crop is reported to be an almost total failure, both in England and the United States.

At the drug sales this month, three bales of false buchu leaves, *Empleurum serrulatum*, and five bags of a new buchu with linear obtuse leaves, and also the leaves of *Barosma vulgaris*, were offered. A bag of a bitter bark, apparently that of a species of *Esenbeckia*, and some of which has on previous occasions been sold as Cusparia bark, was again placed on the market. Seventy-five bags of the stems of *Coscinium fenestratum* were offered as Colombo root, and some of the mouldy ipecacuanha, mentioned last month, after having been washed and dried, was again put up for auction. Adulterated matico was also offered for sale. Among the rarer drugs there were observed the following:—Korarina cardamoms, Ceylon cardamoms, condurango barks, salep, castoreum, and Yunnan musk.

Mr. N. Stevenson has recently utilized the electric light in a novel direction, by using a small incandescent lamp, fitted into a vulcanite cup, for illuminating the cavity of the mouth during dental operations. The vulcanite cup serves to keep the mouth open (*Lancet*, Nov. 25, p. 928).

In a paper presented to the Academy of Sciences (*Comptes Rendus*, xcv., 841), M. Delacharlonny describes a new ferric sulphate and its application to the making of blood manure. When blood is treated for this purpose with solution of ordinary ferric sulphate it is coagulated and forms a pasty mass that requires considerable evaporation before it is dry. A better effect is said to be produced by using an acid ferric sulphate, corresponding in composition to the formula $Fe_2O_3 4SO_3$, which is prepared by oxidizing ferrous sulphate with nitric acid, adding to the solution a sufficient quantity of sulphuric acid to make up the relative proportions, and concentrating, when it forms a crystalline mass. A solution of this salt, sp. gr. 1·4, added to fresh blood is said to convert it almost instantaneously into a stiff clay-like but elastic paste, from which most of the water drains away, leaving only a small quantity to be removed by expression or heat. The new salt forms a hydrate which crystallizes readily with twelve molecules of water.

Mr. E. H. Cook has contributed a thoughtful and interesting paper to the *Philosophical Magazine* ([5], vol. xiv., p. 387) on "Carbon Dioxide as a Constituent of the Atmosphere." The sources whence the air derives its carbon dioxide are taken as four, namely, (1) combustion of carbonaceous bodies; (2) respiration of animals; (3) decomposition of vegetable and animal substances; (4) volcanoes and other subterranean supplies. The author deduces from calculation and statistics that these four sources yield at least 50,000,000,000 kilogrammes of carbon dioxide daily. Further, he states that the amount of carbon dioxide in the atmosphere would be double what it is at present in about one hundred years if there were no means of compensation. The com-

pensating influences are taken as three: (1) fixation of carbon by growing plants; (2) removal of dioxide by zoophytes; (3) absorption of dioxide by inorganic chemical actions. After making all allowances the author considers that terrestrial vegetation absorbs as much as 900,000,000,000 of kilogrammes of dioxide per day, an amount which is much greater than that produced from all sources taken together. Mr. Cook believes that the second compensating cause, although very powerful, seems rather to be one whose influence is only felt after the lapse of many years, and for activity cannot be equal to the first one. The third cause is apparently almost as great as the first, inasmuch as Dr. Sterry Hunt has shown "that a weight of carbonic dioxide equal to more than twenty-one times that of our present atmosphere would be absorbed in the production from orthoclase of a layer of kaolin extending over the earth's surface with a thickness of 500 metres, an amount which evidently represents but a small proportion of the results of felspathic decay in the sedimentary strata of the globe." Reliable data are not available for definitely answering the question as to the maintenance of a constant proportion of carbon dioxide in the atmosphere. The author, however, inclines to the belief that the causes at work removing atmospheric dioxide are more powerful than those producing it, and that the greater part of this so removed is becoming fixed in the earth's crust. The question as to the source of the immense quantities already fixed in this way is still left an open one. Brongniart has suggested that it all at one time formed part of the atmosphere of the globe. Dr. Sterry Hunt considers that a universal atmosphere of the same quality as that of the earth's exists, from which the carbon dioxide now fixed in the earth's crust has been derived. It is pointed out that if Dr. Hunt's hypothesis be a correct one it is interesting to remember that the carbon contained in our bodies may have existed at one time as a portion of the body of an inhabitant of the most distant member of the universe.

In the course of the past month the Council of the Royal Society has made known its decision as to the award of medals for the current year. The Copley medal goes to Professor Cayley, for his researches in pure mathematics, and the Rumford medal to Captain Abney, for his investigations in connection with photography. One Royal medal is awarded to Professor W. H. Flower for zoological work and another to Lord Rayleigh for his papers on mathematical and experimental physics. Lastly, the Davy medal is to be presented in duplicate, the recipients being Professors D. Mendelejeef and Lothar Meyer, in recognition of their discovery of the periodic relations of the atomic weights.

A NEW FORM OF APPARATUS FOR ESTIMATING AMMONIA IN POTABLE WATERS.*

BY C. R. TICHBORNE, LL.D., F.C.S., ETC.

According to the generally accepted method of examining potable waters, the estimation of minute traces of ammonia existing as such, and the ammonia which results from the oxidation of nitrogenous organic matter, are looked upon as being of the greatest importance in arriving at a conclusion as regards the quality of the water. The process may be concisely described as distilling off a third of the water, and estimating the ammonia in the distillate by Nessler's delicate process, which leaves nothing to be desired as regards its accuracy.

As the amount to be determined does not much exceed 1 part in 10,000,000 parts, it is evident that is it necessary to avoid any accidental contamination from atmospheric ammonia. This is particularly the case in chemical laboratories, where ammoniacal solutions are constantly undergoing evaporation, and the air is contaminated with that volatile base.

The fact is, of course, well recognized by all expert analysts, and is generally guarded against by the use of a special cupboard or chamber, in which the whole operation can be performed. Such a method is more or less imperfect, because the gas-burner used will itself, under certain conditions, become a source of ammonia. Also, it is evident that a general ammoniacal atmosphere in the adjacent laboratory will find its way into the chamber by the ordinary laws of diffusion.

The capacity of the vapour of water (when in the act of condensing) of absorbing traces of ammonia is something extraordinary, and can only be appreciated by the practical worker.

In distilling potable waters, I was accustomed to work with an ordinary retort and receiver—the latter being provided with a specially-contrived mercurial valve. Now, although this was satisfactory in closing the interior of the retort and receiver from general contact with atmospheric impurities, occasionally a regurgitation would take place, and admitted a little of the laboratory air.

The following arrangement has been lately adopted by myself, and, both as regards simplicity and efficacy, leaves nothing to be desired. It is, in fact, so simple that, to a superficial observer, my communication might at first sight appear superfluous, but the importance of the question involved renders any apology unnecessary.*

At ordinary temperatures very weak solutions of ammoniacal gas (such as we have to deal with in the analysis of potable waters) are fairly permanent; but, in the gaseous conditions, owing to the different tensions of the vapour of water and ammonia, this stability no longer exists. Again, small traces of ammonia in the gaseous condition are instantly absorbed by water in the non-gaseous condition. These are the two equal sources of error to be guarded against in the distillation of ammonia from potable waters, and, bearing these two points in view, I adopted the arrangement figured on the next page.

It consists of a retort fitting into a fairly long-necked receiver, with an india-rubber stopper. The arrangement must be air-tight. The receiver is connected with a bent tube proceeding from its stopper, and connecting it with two bulb tubes of a special form, and marked respectively "A" and "Z." This marking is to prevent any confusion in the hurry of manipulation, as they are exactly the same shape. The bulb tubes are somewhat similar to a flat Liebig's potash bulb, but with two pear-shaped bulbs on each side, to prevent regurgitation of the fluid, and three absorption bulbs at the bottom. The centre bulb of these three is provided with a glass tap for filling and emptying the apparatus.†

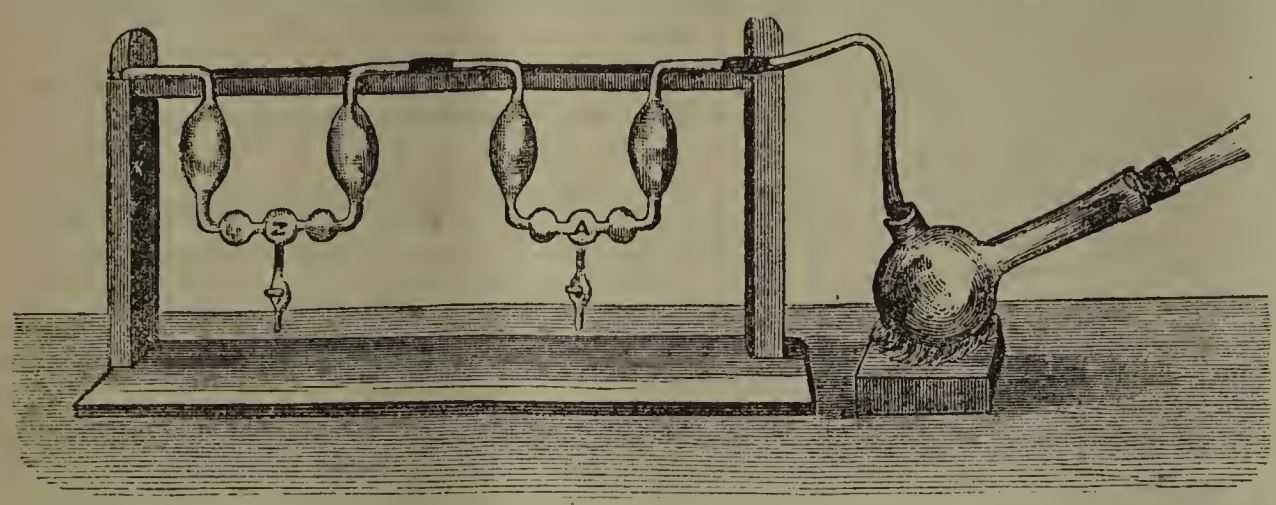
The water to be examined is poured into the retort and one-third distilled over gently, but at a fairly good rate. If operating upon half a pint, the operation should take about one hour. The whole apparatus is previously connected together, and the two bulbs are filled with

* Paper read before the Royal Dublin Society, February 20, 1882. From the *Scientific Proceedings* vol. iii., part v.

* One of the recent important works upon chemistry, is Roscoe and Schorlemmer's 'Treatise on Chemistry.' In that book there is a description of the determination of ammonia in potable waters, but there is no provision against this fruitful source of error. If the determination were carried on as it is figured at page 252, vol. i., of that work, the results would be utterly unreliable in any laboratory where other analyses were being performed.

† Bulbs of my pattern are made by Messrs. Cette and Co., of London.

water free from ammonia (*i.e.*, water which has been boiled rapidly in a flask, until it gives no reaction with



the Nessler reagent). The bulbs are easily filled by opening the tap, inserting the point of the tap tube into a beaker of the water, and sucking with the breath gently—at the same time, stopping the other end of the bulb tube by the finger.

After the operation is completed, the most of the ammonia, if not all, is present in the receiver, whilst any vapour which might have escaped therefrom is caught in the tube "A;" at the same time, any atmospheric ammonia which enters by regurgitation is caught in the bulb tube "Z." "A" is run into the distillate in the receiver, whilst "Z" is rejected. In practice, it is not necessary that the water in "Z" should be changed for twenty or thirty operations, providing that an increased amount of ammonia is not about in the laboratory atmosphere; but if so, it is desirable to change with each experiment.

If we consider the points that I have dwelt upon as being sources of error, we shall see that this simple apparatus fulfils absolutely the necessary conditions, and that the tube connecting the bulbs "A" and "Z," *contains an atmosphere perfectly neutral as regards ammonia*, because it is the space between two liquids which do not give off ammoniacal gas, and which give off vapour of an equal tension.

I may mention that, on submitting it to experimental proof, the use of an acid in either of the bulb tubes proved a mistake.

It is not necessary to give further details, but I may as well state that in many crucial experiments, I have been in the habit of estimating the amount of ammonia in the receiver, and both bulbs "A" and "Z." The following, as regards Vartry water, will serve as an illustration:—

Distillate in receiver	0·003 per 100,000.
Bulb "A" (nearly)	0·001 ,,

Bulb "Z" gave an indication which affected the Nessler, but which was not sufficient to estimate.

A SUMMARY OF THE CINCHONA BARKS OF COMMERCE.*

BY WILLIAM ELBORNE,

Assistant Curator of the Museum of the Pharmaceutical Society of Great Britain.

The important genus Cinchona gives its name to the order of which it is a member, namely, *Cinchonaceæ*. Botanically the genus includes trees of various sizes, some reaching an altitude of 80 feet and upwards, with evergreen leaves and deciduous stipules. The flowers are of a white or pinkish colour, very fragrant and arranged in panicles. The corolla is salver shaped, and nearly, if not quite, conceals the five stamens. The ovary is crowned with a fleshy disc; the style simple; the stigma two-cleft. The fruit is an ovate capsule, grooved on both sides, crowned by the limb of the calyx, and dehiscing from below upwards, in order to allow of the escape of the numerous winged seeds, which latter peculiarity is especially characteristic of the order. According to the enumeration of Bentham and Hooker, thirty-six species have been distinguished; but of these not more than about a dozen have been economically utilized as furnishing the commercial cinchona, or Peruvian bark. The plants are natives of the western mountainous regions of South America, their geographical range extending from 10° N. to 22° S. lat.; and they flourish generally at an elevation of from 5000 to 8000 feet above the level of the sea, although some have been noted as growing as high as 11,000 feet, and others have been found down to 2600 feet. Of the commercial barks there are several varieties They are as follows:—

I.	*C. officinalis*, var. *a*, *Condaminea*	yielding crown bark.
	,, ,, *b*, *Bonplandiana*	
	,, ,, *c*, *crispa*	
II.	*C. succirubra* (Pavon) yielding red bark.	
III.	*C. lancifolia*, *C. cordifolia*	yielding Colombian bark.
IV.	*C. Pitayensis*, yielding Pitayo bark.	
V.	*C. nitida*, *C. micrantha*, *C. Peruviana*	,, grey bark.
VI.	*C. Calisaya*	,, yellow bark.
VII.	*Remijia Purdieana*, ,, *pedunculata*	yielding Cuprea bark.

The official barks of the British Pharmacopœia are four in number:—(1) The pale Loxa or crown bark (*cortex cinchonæ pallidæ*), yielded by *Cinchona officinalis*; (2) The yellow or Calisaya bark (*cortex cinchonæ flavæ*), the produce of *C. Calisaya*; (3) The red bark (*cortex cinchonæ rubræ*), derived from *C. succirubra*; and (4) Colombian bark, *C. lancifolia*, directed to be used as a source of quinine. These are the sources of the tinctures, extracts and other preparations, while, in common with several others, they also yield the alkaloids which now constitute the chief form in which the active principles of the barks are administered in medicine. Their great value depends upon the presence of these alkaloids, viz., quinine, quinidine, cinchonine and cinchonidine, which exist principally in the cellular tissue outside the liber, in combination with kinic and tannic acids. It is found that certain barks contain more of one principle than of another; hence their greater or less commercial value, and the skill and complex knowledge required by the manufacturer to distinguish the different varieties. The *C. Calisaya*, *C. officinalis* and *C. lancifolia* from Colombia are species rich in quinine, which, in the form of sulphate, is the alkaloid most extensively employed in medicine. Among the other barks used as sources of quinine, etc., the principal are:—Colombian bark, *C. lancifolia*; Pitayo bark, *C. Pitayensis*; grey or Lima bark, *C. micrantha*, *C. nitida* and *C. Peruviana*; and a variety of Carthagena bark, *C. lanceolata*. In addition to quinine the *C. Pitayensis* specially contains quinidine, the *C. succirubra*, cinchonidine, and the *C. nitida*, *C. micrantha* and *C. Peruviana*, from the Huanuco region, cinchonine. These alkaloids, extracted from the barks, are recognized by their several distinctive chemical characteristics, while the barks producing them are likewise distinguished by a careful scrutiny of their external appearance, the lichens, etc., growing on them, the way in which they break, their taste and odour, as well as by their microscopical and chemical characters. The manner in which barks break transversely, or their fracture, as it is termed, depends

* Paper read before the Chemists' Assistants' Association.

on their anatomical structure, and affords an important criterion of the quality of the bark, cellular tissue breaking with a short or smooth fracture, woody tissue with a fibrous fracture. The best characteristics by which barks containing much quinine may be distinguished are the shortness of the fibres which cover the transverse fracture and the facility with which they may be detached, instead of being flexible and adhering as in bad barks. Thus when dry Calisaya is handled a quantity of very small splinters run into the skin causing much irritation, and this forms one of its distinguishing marks. The importance of cinchona barks in medicine renders it necessary to give some account of the manner in which they are collected and dried in their native forests and prepared for exportation. The following notice has been extracted, therefore, chiefly from Weddell and Markham.

The hardships of bark collecting in the primeval forests of South America are of the severest kind, and undergone only by the half-civilized Indians and people of mixed race, in the pay of speculators or companies located in the towns. Those who are engaged in the business, especially the collectors themselves, are called *Cascarilleros*, from the Spanish word *Cascara*, meaning *bark*. A *major-domo* at the head of the collectors directs the proceedings of the several bands in the forest itself, where provisions, and afterwards the produce, are stowed away in huts of light construction.

The cascarillero, having found his tree, has usually to free its stem from the luxuriant climbing and parasitic plants with which it is encircled. This done he begins in most cases at once to remove, after a previous beating, the sapless layer of outer bark. In order to detach the valuable inner bark, longitudinal and transverse incisions are made as high as can be reached on the stem. The tree is then felled and the peeling completed. In most cases, but especially if previously beaten, the bark separates easily from the wood. In many localities it has to be dried by a fire made on the floor of a hut, the bark being placed on hurdles above, which proves a serviceable arrangement. In Southern Peru and Bolivia, however, even the thickest Calisaya bark is dried in the sun, without requiring the aid of a fire. The thinner bark as it dries rolls up into tubes or quills, while the pieces stripped from the trunks are made to dry flat by being placed one upon another and loaded with weights. The bark of the root was formerly neglected, but is now in several instances brought into the market. After drying, the barks are either assorted, chiefly according to size, or all are packed without distinction in sacks or bales. In some places, the bark is even stamped, in order to reduce its bulk as much as possible. The dealers in the export towns enclose the bark in *serons* of raw bullock-hide, which, contracting as it dries, tightly compresses the contents of the package (100 lbs. or more).

The ports to which bark is conveyed for shipment to Europe are not very numerous. Guayaquil, on the Pacific Coast, is the most important for produce of Ecuador; Pitayo bark is largely exported from Buenaventura in the Bay of Choco, further north.

Payta, the most northerly port of Peru, and Callao, the port of Lima, likewise export bark, the latter being the natural outlet for the barks of Central Peru, from Huanuco to Cusco. Islay, and more particularly Arica, receive the valuable barks of Carabaya and of the high valleys of Bolivia. Among other ports may be mentioned Santa Marta, Savanilla and Maracaibo.

Our imports for 1881 and 1880 were thus made up:—

	1881.	1880.	
Calisaya . .	7,020	6,580	serons and cases.
Soft Colombian, New Granadian Pitayo.	87,200*	44,500	„ „ bales.

* This includes cuprea, the imports of which, in 1881, were 60,000 packages.

	1881.	1880.	
Carthagena .	5,720	6,480	serons and bales.
East Indies and Ceylon	15,400	20,690	„ cases and ballots.

The receipts in America, mainly direct from Colombia and New Granada, were as follows:—

1881.	1880.	
31,400	32,800	serons and packages.

The imports into France were also thus made up:—

	1881.	1880.	
Calisaya . .	9,915	8,590	packages.
Colombian, etc.	16,550	11,580	„

From the above tables it is noticeable that the richer barks still continue to be consigned to England.

The reckless system of bark cutting in the forests of South America, which has resulted in the utter extermination of the tree from many localities, has, within recent years, aroused the attention of the Old World, and at length prompted serious efforts to cultivate the tree on a larger scale in other countries. The enterprise undertaken by Markham in 1859, of introducing the cultivation of Peruvian bark trees into British India and Ceylon, is now an assured success. During twenty years the enterprise has since steadily progressed. There are now more than 900 acres under cinchona cultivation in the Government plantations on the Nilgiri Hills, besides 4000 acres of private plantations on the Nilgiris, in Wainad, Coorg, and other hill districts of Southern India. In British Sikkim the Government plantations cover an area of 2242 acres. The annual bark crop from the Government plantations of British India alone is already 500,000 lbs. In 1879–80 the quantity of bark sold in the London market, from British India and Ceylon, was 1,172,060 lbs. Moreover, the East India source of bark supply is now a most important one as regards both quantity and quality. Thus the whole enterprise of introducing all the valuable cinchona species from South America into India, Ceylon and Jamaica, has been made complete in all its parts, and as at present *C. succirubra* and *C. officinalis* greatly preponderate, these species will form the main sources of the future bark supply from India.

The methods adopted in India of harvesting the bark are also worthy of comment, as they have proved a means of considerably increasing the yield of alkaloids. They comprise the two different systems known as "mossing" and "coppicing." The "mossing" system consists in longitudinally stripping eight-year old trees of their bark at intervals of about 2 inches apart, winding moss all round the decorticated parts and tying it on with fibre. At the end of six or twelve months the strips of bark left untouched at the first stripping are removed, and the intervals they occupied on the trunk are mossed. At the end of twenty-two months, on an average, the spaces occupied by the bark originally taken are found to be covered with *renewed* bark, much thicker than the natural bark of the same age, and this renewed bark can be removed and a fresh process of renewal again be fostered by moss. The enrichment of the renewed bark is said to be at the expense of the bark outside the mossed region; and also that the renewal is prevented or much retarded by the least injury to the cambium layer. The protection from light afforded by the moss also has been proved to increase the supply of alkaloid.

The "coppicing" system consists in cutting down the trees near the ground and allowing one or more of the young crops of the shoots which rise from the stumps to grow. The trees are barked at the proper season by coolies, to whom the felled stems and branches are made over as soon as they are cut. Provided with a stout knife, the coolie first marks the bark off into long narrow strips by putting his knife under it and pressing upwards. The end being freed, the remainder of the strip readily

comes off; the bark is then laid to dry in sheds fitted with open shelves made of split bamboo.

Of the barks used in pharmacy, as before stated, four in number are official in the British Pharmacopœia. Of these, *C. officinalis*, *C. succirubra* and *C. Calisaya* are the sources from which the pharmaceutical preparations are directed to be made, while *C. lancifolia* is alluded to as a source of quinine. The following is a brief description of the distinguishing characters of these important barks :—

Cinchona Officinalis, Pale Cinchona, Loxa or Crown Bark (*Cortex Cinchonæ Pallidæ*).—This species is a native of Ecuador and Peru, existing under several varieties. It forms a large tree having lanceolate leaves, usually pointed, glabrous and shining on the upper surface. The flowers are small, pubescent, and in short panicles and are succeeded by oblong or lanceolate capsules, ½ an inch or more in length. The bark yielded by this tree, which formerly was the ordinary Peruvian bark of English medicine, is only found in the form of quills, which are occasionally as much as a foot in length, but more often in fragments of a few inches. The quills are from ¾ to ¼ of an inch in diameter, having a blackish-brown or dark-grey external surface, variously blotched with silver-grey, and frequently covered with large and beautiful lichens. The surface of some of the quills is longitudinally wrinkled and moderately smooth, but in the majority it is distinctly marked by transverse cracks. The inner side is closely striated and of a bright yellowish brown.

The bark breaks easily with a fracture which exhibits very short fibres on the inner side. Though chiefly afforded by *Cinchona officinalis*, other species occasionally contribute to furnish the Loxa bark of commerce, as shown in the table above. Owing, however, to the bark having become nearly extinct in its native regions, at the present day it is scarcely possible to obtain genuine Loxa or crown bark from South America; the immense plantations on the Nilgiri Hills of Madras, in the Sikkim Himalayas and elsewhere in India, Ceylon, and Jamaica, are at present the chief sources of the bark in commerce.

The analyses of Howard show that the different varieties of crown bark vary much in the proportion of alkaloids they contain, South American bark yielding on an average ·5 to 1 per cent. of alkaloids, while the Indian bark yields as much as 4·30 to 5 per cent., consisting principally of quinine, and next in order cinchonidine and cinchonine. It might also be noticed here that the official pale bark of the United States Pharmacopœia also includes the kind of bark which is derived from *Cinchona micrantha*, a bark which was formerly official in the Edinburgh and Dublin Pharmacopœias under the name of *Cinchona cinerea*, and which is known to commerce as grey or Huanuco bark.

Cinchona Succirubra, Red Bark (*Cortex Cinchonæ Rubræ*). The tree yielding this species, although formerly growing in all the valleys of the Andes, is now almost entirely confined to the forests of Guaranda on the western declivities of Chimborazo, at 2000 to 5000 feet above the level of the sea. The tree has broadly ovate leaves attaining about a foot in length, nearly glabrous above, pubescent beneath, and large terminal panicles of rose-coloured flowers, succeeded by capsules from 1 to 1¼ inch long. Red cinchona bark occurs in quills and flat pieces. The quills vary in diameter from ¼ to 1½ inch, and in length from 4 to 12 inches or more. The so-called flat pieces are frequently slightly incurved, from 1 to 5 inches broad, ¾ of an inch in thickness and about 2 feet in length. Red cinchona bark is generally coated and consists of liber, the cellular and tuberous coats, and usually more or less of the epidermis; its outer surface is generally rough, furrowed and frequently warty. The colour of the epidermis varies; in the thinner quills it is reddish-brown; in thick quils and flat pieces it varies from a reddish-brown to a chestnut-brown, frequently with a purplish tinge. Cryptogamic plants are not so frequent on this as on some other kinds of bark. The cellular coat of the flat pieces is very thick and spongy, much more so than in yellow cinchona bark. The inner surface of the quills is finely fibrous, giving a comparatively smooth fracture, while the fracture of the flat pieces is both fibrous and splintery. As to the proportion of alkaloids in red bark, the thick flat sort contains only 3 to 4 per cent. of alkaloids, but a large amount of red colouring matter. In reference to the brick-red colouring matter which, as Ruiz observes, is not found in the growing plant, but in the dried bark, Mr. J. E. Howard considers that it is really an excretory product of vegetation, a part used up and brought by contact with the air into a state in which it can no longer be serviceable to the living plants, and from which it still degenerates by a still further degeneration into *humus*. The pieces of flat red bark possessing the finest colour are generally remarkable for their specific lightness, having a texture analogous to that of wood that has lost its firmness by incipient decay. Indeed, it is by a process of *eremacausis* that the red bark acquires its colour, the cinchotannic acid in which it abounds having become oxidized and changed into cinchona red, and under these conditions the alkaloids also appear to undergo some corresponding alterations. They are now implicated with resin, which appears to have also become oxidized so as to act the part of an acid, and is with difficulty separated. But the most remarkable feature is the altered conditions of the alkaloids themselves. Quinine, which formed a considerable portion of the whole, is now greatly diminished, while cinchonine and cinchonidine remain much the same. The quill red bark of the Indian plantations is a much better drug, some of it yielding 5 to 10 per cent. of alkaloids, less than a third of which is quinine and a fourth cinchonidine, the remainder being cinchonine and sometimes traces of quinidine.

The experiments of Mr. J. E. Howard and others have also proved that the bark of the root contains a larger proportion of alkaloids than that of the stem; and further that the proportion of alkaloid diminishes as we go up the stem to the branches.

Mr. David Howard has also shown that the nature of the alkaloid varies according to the part of the tree from which the bark has been taken.

Cinchona Lancifolia, Soft Colombian.—Of the barks not used in pharmacy the most important are afforded by *C. lancifolia* and *C. Pitayensis*, natives of the Cordilleras of Colombia. These barks are largely imported and used for making quinine, the former under the name of soft Colombian, Carthagena or Caqueta bark. The bark of *C. lancifolia* varies much in appearance, but is generally of an orange-brown; the corky coat, which scales off easily, is shining and whitish. It also often occurs in more or less curved or quilled pieces of tolerable thickness, having externally the remains of a whitish silvery epidermis; but their greatest distinguishing character is their very fibrous fracture. Their anatomical structure, according to Hanbury, agrees, in all varieties, in the remarkable number of thick-walled cells of the middle cortical layer and the medullary rays. In percentage of alkaloids, Carthagena barks are liable to great variation.

The *Pitayo* barks are restricted to the south-western districts of Colombia, and are usually imported in short flattish fragments or broken quills. The middle cortical layer exhibits but few thick walled cells; the liber is traversed by very wide medullary rays, and is provided with but a small number of widely scattered liber fibres, which are rather thinner than in most other cinchona barks. The Pitayo barks are usually rich in alkaloids, quinine prevailing. *Cinchona Pitayensis* is one of the hardiest species of the valuable cinchonas, and is, therefore, particularly suitable for cultivation, which, however, has not been carried out as largely as that of either *C. officinalis* or *C. succirubra*. The hard Colombian bark of commerce, which occurs usually in flat pieces and

also in quills, is obtained from *C. cordifolia*. The quills are usually large, heavy and without periderm, with a fracture not so fibrous as that of *C. lancifolia* (soft Colombian bark). The flat pieces are thin, hard, somewhat curved, with the remains of a white periderm.

In reference to the *grey* barks of commerce, *C. micrantha*, *C. nitida* and *C. peruviana*; they abound in the province of Huanuco, which is their principal source, and are all imported under the name of Huanuco or grey bark. The name of grey bark refers to the striking effect of the overspreading thallus of various lichens belonging to the order *Graphideæ*, forming groups, and indicating that the trees have grown in an open situation, exposed to rain and sunshine. These barks occur in quills and flat pieces; the former are eagerly sought after by manufacturers on the continent, while the flat pieces are just as readily sought for here, because they very much resemble in appearance the flat calisaya, for which at present they are very extensively substituted on account of the great scarcity of the latter. They each yield from 2 to 3 per cent. of cinchonine and cinchonidine, with scarcely any quinine.

Cinchona Calisaya, Yellow Bark (Cortex Cinchonæ Flavæ).—This valuable species was discovered by the late Dr. Weddell in 1847. It grows in the valley forests on the borders of Bolivia and South Peru (Carabaya). The bark was formerly imported in serons, principally from Arica, the nearest port to the Bolivian district of La Paz, where it was chiefly collected; but the supply of calisaya bark from its natural habitats is at the present time very uncertain. The cultivation of this bark in India has not been hitherto so successful as that of *C. succirubra* and *C. officinalis*, although recent accounts have been more favourable. For its introduction to India, as well as that of other species of Cinchona, we are more particularly indebted to Mr. Markham. Two varieties of this bark are distinguished in commerce—flat and quilled.

Flat Calisaya.—The pieces of this bark are flat, or nearly so, as their name implies. They are generally uncoated, consisting almost entirely of liber, which is sometimes $\frac{1}{8}$ or nearly $\frac{1}{2}$ an inch thick. Their texture is compact and uniform; the transverse fracture is finely fibrous, the fibres being short and readily detached, so that when this bark is handled it causes much irritation. Externally the colour is slightly brownish-tawny yellow, frequently interspersed with darker patches; the surface is marked by shallow longitudinal depressions, commonly termed digital furrows, which are caused naturally on separating the periderm from the liber, and not by the instrument used in detaching it as formerly supposed. Internally the surface has a wavy fibrous appearance; the taste is very bitter—the bitterness being gradually developed on chewing. The bark of the root is readily known from that of the trunk and branches, by occurring in short more or less curved or twisted pieces. Calisaya bark is the best of all the cinchona barks; but little, however, is now obtained from South America, our supplies being chiefly derived from plants under cultivation in India and Java. One variety of *Cinchona Calisaya*, which has been more especially cultivated in Java, and known as var. *Ledgeriana*, yields a bark of extraordinary richness in alkaloids.

Calisaya bark is remarkable for the large amount of quinine it contains, good qualities yielding at least 5 or 6 per cent. of this alkaloid.

Amongst other valuable barks which occur extensively in the market must be mentioned cuprea bark and the bark from *C. pubescens*, a variety of *C. robusta*.

The *cuprea bark*, which of late has been imported in enormous quantities, is furnished by two very distinct regions, viz., the base of the great eastern branch of the Cordillera of the Andes, and the valleys of the Rivers Meta and Guavire, affluents of the Orinoco. The centre of exportation is Bacaramanga, in the State of Santander. Cuprea bark is yielded by trees belonging respectively to at least two distinct species which, though nearly allied, are yet different from each other, and belong to the genus *Remijia*, which comes very near that of *Cinchona* and to the closely allied genus, *Cascarilla*. These species are *Remijia Purdieana* and *Remijia pedunculata*, Triana. The resemblance between the barks of the two species is very great and it would be difficult to find characters sufficiently marked to distinguish them. They are both, in fact, hard, very compact, relatively heavy, the inner surface smooth and of a wine-red colour; the epidermis is thin and striated longitudinally. The cuprea bark which yields cinchonamine is, however, heavier and more compact and more filled with red resinous colouring matter, and its fracture generally appears to be horny. The yield of quinine from cuprea barks varies between 1 and 2 per cent., according to the conditions of vegetation of the trees, which have not yet been sufficiently studied. From a chemical point of view, the characteristic and remarkable feature which distinguishes the cuprea barks from the true cinchonas is the absence of cinchonidine and the presence of a peculiar alkaloid called homoquinine or ultraquinine, the salts of which very closely resemble those of quinine.

Cinchona pubescens.—This valuable bark is taken from a hairy leaved tree, believed to be a hybrid between *C. Calisaya* and *Cinchona officinalis* and on that account was at one time called *C. officinalis*, var. *pubescens*. The tree produces enormously thick bark and is one of very rapid growth. In a letter to Mr. Howard, Mr. McIvor writes, "If under all conditions this bark be found to yield 12 per cent. of alkaloids consisting of 6 per cent. quinine sulphate, it is certainly the best plant we can grow, being hardy and of rapid growth, and perfectly free from canker and other diseases to which the *Calisaya* and *Officinalis* are liable." The appearance, therefore, of these extraordinary plants, with their enormous yield, indicates the importance of cultivators paying close attention to the phenomena of hybridization and of studying the subject with a view of further improvement.

Pharmacy.—In the opinion of pharmacists the bark most suitable for medicinal use is the *Cinchona succirubra*, and as I have the privilege of addressing those directly or indirectly connected with pharmacy, it would not, perhaps, be out of place to mention the cause of this preference and the names of the writers who speak the strongest in its favour.

Mr. Holmes, in a paper read some time ago, pointed out that the red bark supply would in all probability be always equal to the demand on account of its growing at a much lower elevation, and consequent distribution over a much wider area, the amount of that bark grown was greater comparatively than of the other cinchonas. Mr. Holmes also pointed out that it could be procured of good quality, that it contains all the alkaloids with the exception of aricine, and that it was less liable to be mixed with hybrids, on account of its characteristic appearance.

Professor Flückiger also suggests the use of *Cinchona succirubra*, in 'Pharmacographia;' and both Mr. Umney and Mr. R. W. Giles have repeatedly pointed out the unsatisfactory results of using the yellow barks for pharmaceutical preparations.

Dr. de Vrij, some months ago, published a form for the preparation of red bark extract; the advantages it claims over most of the extracts now met with are its easy mode of preparation, and especially the production of a clear solution when it is mixed with water.

In conclusion, I have to thank Mr. Holmes for much valuable information and for the use of the Museum specimens, also Mr. W. E. Crow, one of the present Bell Scholars, for many useful suggestions. For much of the information contained in this paper I am also indebted to the following works:—Howard's 'Nueva Quinologia,' Markham's 'Peruvian Bark,' Bentley and Trimen's 'Medicinal Plants,' Flückiger and Hanbury's 'Pharmacographia.'

The Pharmaceutical Journal.

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THE ABUSE OF NARCOTICS.

THE report on page 456, of an inquest held a few days since at Croydon, furnishes another instance of the lamentable spread of the habit of opiate drinking to which we have frequently called attention in these columns as having undoubtedly been greatly fostered by the present lax state of the law in regard to the sale of poisons under the guise of patent medicines. If, too, it correctly represents what took place at the inquest it well illustrates the mischievous rubbish which is sometimes talked when witnesses and jurymen are under the temporary excitement caused by such an inquiry. For, supposing that the statement of the medical witness be correct, that the bottle found near the deceased originally contained one hundred grains of chloral hydrate, as well as his speculation that the deceased had made up this quantity by going to different chemists and obtaining small quantities from each, apparently by the use of a prescription, it is not evident how this warrants the denunciation of chemists or the assumption that they supply drugs of the description of chloral in a wholesale fashion to any person who asks for them. It seems to us to be rather a matter for comment that a woman known to have been in the habit, for several years past, of taking chloral hydrate "to quiet her nerves" should have been in possession of a prescription ordering an indefinite quantity of that narcotic. Certainly if, armed with such a document, the deceased had to go to several chemists before she could make up the hypothetical one hundred grains, it cannot be justly said that the dispensers did not exercise the "discretion" which seems to have been wanting in the writer of the prescription.

But quibbling as to whether as much as one hundred grains of chloral hydrate was or was not jointly supplied on a prescription by several chemists is mere child's play in the face of actual facts. It is well known that under the cover of the patent medicine stamp narcotics quite as powerful and dangerous may be bought in unlimited quantity, even from grocers, drapers and "stores." An important paper upon the subject, recently read before the Border Counties Branch of the British Medical Association by Dr. HENRY BARNES, and published in the *British Medical Journal* last week, opportunely illustrates the growth of this traffic. A hospital nurse, aged twenty-four, who came under the author's notice, was suspected of indulging in some narcotic in excess. Upon being questioned she admitted that she was in the habit of taking chlorodyne, and that in less than seven weeks, during which she had been employed in the hospital, she had squandered nearly twenty pounds on its purchase. This confession was confirmed by the presence in her box of fifty-four empty chlorodyne bottles, and she admitted having thrown away half as many more. Those found consisted of one of the 11*s.* size, thirty of the 4*s.* 6*d.* size, fifteen of the 2*s.* 9*d.* size, and eight of the 1*s.* 1½*d.* size, representing together 91½ ounces. She stated that the 11*s.* bottle lasted little more than twenty-four hours, and that her usual dose was a 4*s.* 6*d.* bottle. With this experience, Dr. BARNES calls attention to the fact that this preparation, extensively advertised as it is and having a large sale as a patent medicine, is "said to consist of morphia, hydrocyanic acid, "chloroform and probably also Indian hemp and "belladonna, or its alkaloid, atropia, with some "other ingredients of a less active nature, used to "disguise its real nature and make it palatable." And yet this preparation, containing, if this statement as to its composition be true, five poisonous ingredients, four of which are scheduled poisons, is not even labelled as being poisonous in its nature, and is sold not only by druggists, but even by grocers and miscellaneous patent medicine vendors. Indeed, Dr. BARNES mentions that he recently obtained a specimen from one of the latter class, in whose trade list he found, as an additional recommendation, a statement that he sold it at lower prices than were charged by his neighbours, the duly qualified pharmacists. Of course, the value of the particular preparation referred to in this case, when properly used, is not in question, and the fact that it is issued under the auspices of a gentleman whose name is on the Medical Register, and that it has received a *quasi* endorsement in the prescriptions of other medical gentlemen, is a mere accident. Its position in respect to the law regulating—or rather not regulating—its sale would be the same if it were any one of the numerous class of compounds with eccentric names, which are so extensively advertised as soothing syrups, cordials, carminatives, cough tinctures and essences, though it might be the poisonous concoction of the most ignorant charlatan, and its proprietor a bootmaker or tailor, whose only evident skill was shown in his success in hiding its capability for harm. The point is that the trade in these preparations—whether skilfully prepared or not—is at present carried on under conditions that not only favour, but invite, the widest and most indiscriminate use of powerful opiates by the public.

Impressed with the great increase in the number of victims to the habit of taking narcotics, Dr. BARNES, in his paper, discusses what steps should be taken to aid in weaning them from their be-

setting vice, and with this object he passes in review the poison clauses of the Pharmacy Act, 1868, which he says "was intended to prevent the public from obtaining unlimited supplies of poisonous drugs." Without quite accepting this statement as to its *raison d'être*, we feel warranted in saying that those entrusted with the carrying out of the provisions of the Act will be glad if it can be utilized in combating the growing evil. Dr. BARNES appears to think that the provisions of the Act with respect to the sale of poisons should be made more stringent, and that the distinction as to the two parts of the schedule of poisons should be abolished, or at least that the regulations enforced in the sale of poisons in Part 1 should be extended to chloroform, chloral hydrate and preparations containing morphia. It is not, however, at all clear how this would affect the sale of narcotic "patents." His remarks appear to us to be more to the purpose when he refers to the necessity—which we have before alluded to in speaking of the Croydon poisoning case—for watchfulness on the part of physicians as to the purposes for which their prescriptions may be used. He refers to a prescription of his own, for a mixture of equal parts of spirit of chloroform and tincture of cardamoms, which he was startled one day to find had been repeated to the extent of fifty ounces in eighteen days, when his attention appears to have been drawn to the matter by a pharmacist. Dr. BARNES is, in consequence, disposed to urge that prescriptions containing narcotics should not be repeated more than a certain limited number of times without revision by the prescriber. We have already expressed our opinion that, considering the general feeling of the public in regard to this question, the first step in this direction must be taken by medical men, and that it is especially within the province of prescribing medical practitioners to impose such limitations upon the use of their prescriptions as they may deem fitting and may be able to obtain their patients' assent to.

It may be remarked in conclusion that a parliamentary return, just issued, showing the quantity of opium annually imported into the United Kingdom, has considerable significance in respect to this question. It shows that the quantity of opium imported during the year 1881 was 793,146 lbs., or nearly double as much as was imported in 1880 and nearly four times as much as in 1860. Of this rather more than one half (401,833 lbs.) was re-exported, so that the quantity retained in this country nearly equalled the entire imports of the preceding year.

PHARMACY IN TASMANIA.

A CORRESPONDENT, writing respecting the laws regulating the practice of pharmacy in Tasmania, informs us that the sale of poisons and all medicines in that colony is carefully restricted to the registered chemists, the only exemption made being in favour of the wholesale vending of medicines. Possession of the Minor qualification of the Pharmaceutical Society of Great Britain entitles the holder to registration; otherwise a person has first to pass an examination conducted by a medical board, acting under the provisions of the Tasmanian Medical Act; this is described as a tolerably good practical examination. Our correspondent adds: "It is quite refreshing to escape the contagion of the "'stores,' and to feel once more that he is getting "a decent remuneration for his exertions."

EXPLOSION IN AN ETHER FACTORY.

ON Sunday evening last a tremendous explosion, followed by a fire, occurred at Mr. POLGLASE'S Tyneville Chemical Works, Newcastle, due to the boiling over of a still containing ether, which appears to have been the principal article manufactured in the works. The effects of the explosion were felt over an area covering more than a mile in each direction from the point at which it occurred, but fortunately no lives were lost. The building was entirely demolished, and Mr. POLGLASE has been compelled to issue a circular explaining that he will be unable for the present to execute orders.

THE NEW UNITED STATES PHARMACOPŒIA.

THE great interest excited among United States pharmacists in respect to the new national Pharmacopœia is manifest from the fact that the whole of the first issue was sold before the work was published. A second issue has been prepared, but we understand that copies are not expected to be in the hands of the booksellers in this country for another fortnight.

THE NEXT EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, the 6th inst., when the following papers are to be read:—"The Crystalline Constituent of Jafferabad Aloes," by Mr. W. A. SHENSTONE; "The Sale by Public Auction of Spurious and Worthless Drugs," by Mr. E. M. HOLMES, and "Further Observations on Arsenic," by Messrs. W. A. H. NAYLOR and J. O. BRAITHWAITE.

CHEMISTS' ASSISTANTS' ASSOCIATION.

WE are requested to say that in consequence of the Evening Meeting of the Pharmaceutical Society there will be no meeting of the above Association next Wednesday.

THE CHEMISTS' BALL.

WE learn from a circular that has been issued in respect to stewards to the Chemists' Ball, that the date fixed for it is Wednesday, the 10th of January. As the Ball has always hitherto taken place on the third Wednesday in January, it may be convenient to some readers to point out that the next one will take place a week earlier than usual.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the present session was held in the Pharmaceutical Society's rooms, Edinburgh, on Wednesday evening, November 22, Mr. Peter Boa, President, in the chair.

The minutes of the former meeting having been read and confirmed,

The Chairman called upon Mr. Peter MacEwan to read a paper on—

Alkali Manufacture.

BY PETER MACEWAN.

A change for the better in the chemical industry a few years ago tempted the late Lord Beaconsfield to predict that the general trade of this country was on the eve of improvement. The country smiled at the noble lord's prediction, for it assumed that the basis of it was an unimportant factor in our commerce; but, nevertheless, there was much truth in the forecast of the far-seeing statesman; he knew that most of our important industries are dependent upon the chemical industry for some of their supplies, that increased demands for chemicals means greater activity in textile industry, for instance, for the alkali manufacturer supplies cleaning and bleaching agents to this and allied industries. The manure manufacturer cannot make his superphosphates without sulphuric acid, and if he make greater demand for that article, we must infer that agricultural districts are brisk. Alkali manufacture is the back-bone of the soap trade, and soap is so important an article in the world's commerce, that someone has given it as a truism that a country's position in the scale of civilization may be judged by the quantity of soap which it consumes. I hope, therefore, that apart from the purely technical nature of the subject which I bring before you to-night, there is in it something interesting and of general importance to occupy your thoughts.

The alkali industry is a large one; its products are many, and the methods of production numberless. But our time will only permit us to consider the production of the ordinary soda compounds, and the recovery of useful materials from waste products.

Previous to the French Revolution, the greater part of the carbonate of soda used was obtained from Spain as *barilla*. For the production of this various algæ (salsola, salicorna, etc.) were cultivated. The dried plants on burning yielded an ash consisting of from 5 to 20 per cent. of soda carbonate, with chloride and sulphate, the carbonate being a product of combustion. This ash was the barilla of commerce; its production was necessarily limited, hence industries dependent upon it were conducted on a small scale, and their products were correspondingly dear. The commerce between France and Spain being shaken during the Revolution, barilla reached a high figure, and the industries requiring supplies were almost at a stand-still. Napoleon, therefore, offered a high premium for the invention of a process which would utilize French resources in the manufacture of alkali. Many chemists entered the competition, and the adjudicating committee awarded the premium to M. Le Blanc, a pharmacien, who submitted details of a process which he had already in operation. This was in the year 1794, and the process was one of such merit, that it served not only the purpose of its day, but is now in use and is likely to be for many generations.

A word in passing of M. Le Blanc. The premium which his invention gained he spent in improvements upon his working plant; this soon exhausted his resources, and as his works were not conveniently situated for supplies, he could not compete with others more favourably located. Thus he failed commercially, and his works passed into the hands of the Government. Le Blanc deserved well of his country in his day. Life fame should have been his; but he was permitted to end his days in an almshouse, and a pauper funeral was his reward. Many pharmacists have been eminent men of science, but few of them have done so much benefit to their fellow-men as Le Blanc has done by his alkali process.

Starting with common salt, as required by the French Commission, Le Blanc converted this into carbonate of soda by a method involving at least three distinct reactions or, more properly, stages. These I shall describe in their rotation.

First Stage or Salt-Cake Process.—Common salt is acted upon by sulphuric acid, sulphate of soda ("salt-cake") and hydrochloric acid being produced. In Le Blanc's time and for many years thereafter, this operation was performed in an ordinary reverberatory furnace, but owing to the utter destruction of vegetation for many miles around alkali works, it was found expedient to adopt means for the condensation of the hydrochloric acid gas. The discovery of the bleaching properties of chlorine pointed to the utilization of hydrochloric acid as a means for its production; this helped to hasten on the universal condensation of the acid, and finally, the Alkali Act enforced the condensation of 95 per cent. of the noxious vapours of alkali works. All salt-cake furnaces are now, therefore, built in connection with towers for the condensation of the acid vapours discharged from them. These towers are constructed of Yorkshire flags, filled with coke or flint, down which water trickles, thus dissolving the gas as it ascends, the acid liquors being drawn off at the bottom of the towers. The salt-cake furnaces consist of two portions (diagram shown), first an iron pan, in shape like an evaporating dish, the common diameter of which is about 9 feet, and the thickness of the metal from 3 inches to 7 inches in the centre. This is securely built into brickwork. Beneath it there is an ordinary coal furnace as the source of heat. The pan has a strong iron cover, through which a funnel passes for the exit of hydrochloric acid. There are also two doors, one to admit the charge, the other to withdraw it to the second portion of the furnace called the "roaster." This is merely the hearth of an ordinary reverberatory furnace. Into the pan 10 cwt. of common salt and 80 gallons of sulphuric acid, sp. gr. 1·450, temp. 120° F., are introduced; the heat of the fire underneath ensures a decomposition, which may be fairly represented thus:—

$$NaCl + H_2SO_4 = NaHSO_4 + HCl.$$

In about an hour this change is effected, a third of the common salt being unacted upon. To complete the decomposition the charge is withdrawn to the roaster, when the strong heat present ensures the decomposition of the whole of the common salt, thus:—

$$NaHSO_4 + NaCl = Na_2SO_4 + HCl.$$

The salt cake which is thus produced contains 96 per cent. Na_2SO_4.

Many processes have been proposed for facilitating the production of salt-cake, and for conducting the process more economically. Beneficial modifications of the working plant are very numerous, but in the alteration of the method of production the only process which has been successful or is likely to supersede the old one is that proposed and carried out by Hargreaves. In this process bricks of common salt (artificially prepared) are exposed to the action of sulphurous acid, air and steam, at a temperature of 800° F. The following reaction takes place:—

$$2NaCl + SO_2 + O + H_2O = Na_2SO_4 + 2HCl.$$

The sulphurous acid for this purpose is conveyed direct from pyrites burners, so that it is at a high temperature, and this, combined with the heat of chemical action, economizes fuel greatly; indeed, the inventor antici-

pates such modifications on his salt-cake chambers as shall entirely do away with the use of fuel. This economy, together with the saving of soda nitre (used in sulphuric acid manufacture) and the use of rock salt, form very weighty arguments in favour of Hargreaves's process.

Second Stage or "Balling" Process.—In this salt-cake is fused with coal and limestone in a reverberatory furnace. The furnace is built of brick, lined with fire-brick, and, owing to the intense heat to which it is exposed, is securely bound with iron rods. From the sketch you will observe that it has two hearths, one a brick layer higher than the other; this is the "preparatory hearth;" the lower one nearest the fire is the "decomposing hearth;" communication with each is had by means of side openings, which are closed by strong iron doors having a vertical sliding movement. The construction of the furnace enables two charges to be wrought simultaneously, the weight of each charge being 5 cwts. (The composition of the mixture is:—Salt-cake, 10 parts; limestone, 10 parts; small coal, 7½ parts.) The charge is introduced and spread evenly over the preparatory hearth, and when it has become heated, it is pushed along to the "decomposing hearth," a fresh charge taking its place. In the decomposing hearth it is left undisturbed until surface fusion and formation of roundish clots take place; it is now ready to be carefully turned over so as to expose fresh surfaces, and when it becomes uniformly fused it is mixed dexterously and continuously, so that every portion of the mass may be exposed to the decomposing heat. While this is being done jets of inflammable gas are emitted, and when these fade it is time to withdraw the charge. The process lasts about two hours, and requires the constant attention of skilled workmen.

Improvements on the Process.—Many schemes have been proposed to substitute mechanical for manual labour, and as far back as 1848 Pattinson invented a furnace with mechanical stirrers; these proved more expensive than skilled workmen. In 1853 Elliott and Russel invented a revolving furnace, which, though not at first successful, has become so manageable and effectual in practice as to replace hand-furnaces to a great extent.

I may merely say of these furnaces that they are cylindrical in form, and revolve on large hollow axles which permit of the admission and exit of flame from the coal furnace in connection with them. The revolver is made of malleable iron plates, lined with fire-clay, and of a size sufficient to admit a charge of 5 tons being wrought. The motor of the revolver is a steam engine, capable of producing from one revolution in five minutes to five or more in one minute. The revolutions are slow at the beginning of the process and increase towards the end, about two and a half hours serving to complete the operation. The total substitution of revolving for hand furnaces is merely a question of time, the saving of labour and the advantage of working large quantities of material being fully recognized by the manufacturers.

The fused mass obtained during this stage is termed "black ash," and is a very complex mixture. The principal reactions occurring during its formation are—

First. The reaction between coal and salt-cake:—

$$Na_2SO_4 + C_4 = Na_2S + 4CO.$$

Second. The reaction between sodium sulphide and limestone:—

$$Na_2S + CaCO_3 = Na_2CO_3 + CaS.$$

It is possible that the limestone may be reduced to oxide of lime by the strong heat of the furnace, but the presence of carbon monoxide and air ensures a decomposition as represented. The following are the principal compounds present, together with the bodies present in the dried residue obtained from a solution of "black ash" (the consideration of which I shall return to):—

Black ash.	Per cent.	Solution residue. ("*Soda ash.*")	Per cent.
Na_2CO_3	36·88	Na_2CO_3	67·89
Na_2SO_4	0·39	$NaHO$	14·24
$NaCl$	2·53	Na_2SO_4*	4·57
$Na_2Si_4O_9$ / $Na_2Al_2O_4$	1·87	Na_2S	0·55
CaS	28·68	$NaCl$	3·50
CaO	9·27		
$CaCO_3$	3·31		

Iron and cyanogen compounds are also present in minute quantity, and their presence is a source of great annoyance to the manufacturer, since they impart a yellow colour to the *soda ash.* It is believed that the cyanides are formed at the high temperature existing in the balling furnaces, the nitrogen necessary being principally atmospheric (Mactear).

Hand-furnace "black ash" does not (as a rule) contain so much cyanides as the black ash from revolvers. Mactear obviates the formation in a great part by working with only the theoretical quantity of limestone, adding 5 per cent. of quicklime towards the end of the process. The addition of sulphate of soda towards the end of the process is also recommended, and has proved efficacious, and the same result has been obtained by using a sulphate of any of the alkaline earths.

Third Stage.—It is now the object of the manufacturer to dissolve out the soluble constituents of the "black ash." This requires to be very carefully gone about, for although the lime compounds may practically be considered insoluble, yet that decomposition does take place is evident on comparison of the foregoing tables. In the second table ("soda ash") we find that caustic soda and sodium sulphide have come into existence, and that the percentage of sulphate of soda has very much increased. *These changes are the effect of the water of lixiviation.* Opinion seems to favour the following as the most probable decompositions which occur. In the first place the CaO (quicklime) present is slaked, and this reacts with a portion of the sodic carbonate thus:—

$$CaO + H_2O + Na_2CO_3 = 2NaHO + CaCO_3.$$

The caustic soda thus formed takes up about 15 per cent. of the available soda. The next reaction is one which is even less desirable than the foregoing, calcium sulphide and sodic carbonate undergoing decomposition:—

$$CaS + Na_2CO_3 = Na_2S + CaCO_3.$$

Another 5 per cent. of the available soda is thus changed into an undesirable compound, fully nine-tenths of which is oxidized to higher salts (sulphates, etc.). The investigations of Kolb have shown that these reactions are most energetic with the maximum of water, time and temperature. Taking advantage of this knowledge the manufacturer—with the object of obtaining a solution having a large percentage of sodic carbonate—uses the most expeditious means for lixiviating the black ash. In early days, I may remark, barrels served as plant for this purpose, but this method is both too expensive and slow for this age. The plant now used most commonly consists of a series of vats, provided with perforated false bottoms, and communicating with each other by means of an arrangement of taps and plugs, thus permitting of the liquor from one vat to be run into another as desired, or allowing circulation of the liquors (as a result of their different densities). The system was invented by Mr. Shanks, and is extremely well adapted to the purpose. Whenever the black ash is sufficiently cool to handle it is broken up into manageable pieces and the tanks filled with it; water being run in dissolves as much as it will, and is then withdrawn to settlers. When the ash has become exhausted it is removed from the tanks and set aside as waste. I shall say a few words about this later on. While the liquors are settling they get a preliminary

* Includes sulphites and lower sulphur salts.

surface heat, previous to evaporation; aluminates and silicates here separate, as well as part of the iron and lime sulphides. As it is necessary to oxidize the impurities in the liquors this is done either before or after evaporation. In the former case, the liquors are allowed to trickle down towers of a similar construction to hydrochloric acid towers, in which they meet a stream of air and carbonic acid as they descend, thus oxidizing and carbonating at the same time. By this process the metallic sulphides are reduced to oxides, and alumina and caustic soda are formed from the sodic aluminate.

Evaporation.—To utilize the waste heat of the balling furnaces evaporating pans are built in connection with them, and in such a manner as to enable the flame to pass over the surface of the liquors, or (in other cases) the heat is applied directly to the bottom of the pans. If the liquors have not been oxidized before evaporation it is the practice to mix sawdust with them; this enables drainage to be more readily carried out after evaporation, while the sawdust also acts as the carbonating medium in purifying such residues by roasting. An automatic arrangement keeps the liquors in the pans at a constant level, so that at the end of twenty-four hours a panful of deposit is obtained. This on drying constitutes "soda ash" of commerce, and is the alkali supplied to soap boilers.

Carbonating Process.—The ash being of a yellow colour, and containing much hydrate and sulphate, it is roasted in a reverberatory furnace with an equal bulk of sawdust or equivalent of small coal; much of the hydrate and sulphate are by this means converted into carbonate, and the resulting ash after lixiviation and evaporation is known as "white ash."

Soda crystals are obtained by dissolving white ash in boiling water to saturation nearly, and filtering through calico. The solution is then allowed to settle, a little lime or bleaching powder being added to clarify it. It is then transferred to the crystallizing vats, in which blocks of wood or bars of iron form crystallizing nodes. The mother-liquors from this process yield a weak white ash on evaporation.

Caustic Soda.—This is either prepared direct from the carbonate according to the B.P. process, or the mother-liquors got from the primary evaporation pans are utilized for its preparation. These liquors are of a red colour owing to impurities, such as ferrocyanide of sodium and a red compound (a double cyanide of iron and soda). The process is too long a one to describe at this stage. I may merely say that the sulphides are oxidized with air and superheated steam: ferrocyanides are decomposed by soda nitre, ammonia being evolved and graphite deposited in the pans. Any carbonate of soda present is hydrated by slaked lime. During evaporation it is necessary to withdraw any crystals which may separate; this process is termed "fishing," and is very often performed in the primary evaporation, thus saving much material.

So far I have described the principal features of the Le Blanc process. Much interesting matter has been left out, but sufficient has been given to show you that the process is an ingenious though an indirect one; one drawback to it is the loss of soda which it entails (13 per cent.) and the amount of waste material produced. Considering these drawbacks, the immense amount of labour, plant and fuel required for the process, it is not surprising that other processes have been proposed from time to time. Hitherto, only one of these has been at all successful, namely, the *ammonia soda process.* This was invented by Dyer and Hemming in 1830, and is based upon the double decomposition taking place between carbonate of ammonia and common salt. In practice it was found expedient to use ammonia gas (NH_3) and carbonic acid, which in the presence of water gave the following reaction:—

$$NaCl + H_2O + NH_3 + CO_2 = NaHCO_3 + NH_4Cl.$$

The advantages of any method of manufacture based upon this reaction would, amongst others, be:—

1. A direct product free from impurities.
2. Freedom from noxious vapours.
3. Less waste products.

The process as wrought by the inventors was not a success, the loss of ammonia and wear and tear of apparatus more than compensating for any benefit to be derived from it. During the past ten or fifteen years, more attention has been paid to it, and the improvements made upon working plant enable the process to be conducted without loss pecuniarily. Late improvements have been kept secret, so that I can only give a summary of the methods which were at one time in use. In one of these methods a revolving cylinder for the solution of salt (1 in 3) was used, which cylinder was divided into compartments, each one of which at a certain level was brought into communication with one of the apertures of the perforated axle, through which ammonia and carbonic acid gas were forced. The revolving nature of the vessel ensured thorough mixing, and full provision was made for collecting waste ammonia. By a later method the solution of salt is placed in tanks into which ammonia gas is introduced. The temperature of the mixture rises during this process, and it is necessary to cool it before proceeding further. Then it is withdrawn to cylinders about 30 feet in height and nearly the same in diameter; these are provided at the bottom with suitable apertures for the admission of carbonic acid, which is forced in under a pressure of from one to two atmospheres.

The manufacturer works with a small quantity of water, so that the mother-liquor may contain as little bicarbonate of soda as possible. To free the soda from any adherent chloride of ammonium it is washed with water and a weak solution of bicarbonate of soda. It is reduced to carbonate by roasting, the evolved carbonic acid being again used. There is no doubt about the purity of the resulting salt: it contains 99 per cent. of real carbonate, the 1 per cent. of impurity including water. A better salt for pharmaceutical purposes could not, therefore, be desired, although for some manufactures it is not so well adapted as ordinary alkali.

Our Society's reporters on the Paris Exhibition speak favourably of the new process and its progress on the continent. Much of this progress is due to Messrs. Solvay and Co., who have made many improvements, and turn out annually nearly 30,000 tons of alkali by the ammonia process. One matter which barred the progress of the process for many years was the loss entailed in recovering the ammonia. This was done by heating the chloride with lime, double decomposition taking place.

$$2NH_4Cl + CaO = 2NH_3 + CaCl_2 + H_2O.$$

There being no use for the chloride of calcium it had to be turned away as waste. Weldon patented the use of magnesia instead of lime, and the subsequent decomposition of the magnesic chloride with superheated steam thus:—

$$MgCl_2 + H_2O = MgO + 2HCl.$$

This invention has given a great stimulus to the ammonia process. The recovered magnesia is used again and again, the hydrochloric acid being condensed in the ordinary manner. Apart from all advantages, however, it is well to remember that 5 per cent. of the total ammonia used is lost during each operation. Ammonia is an expensive article and its production is limited. In Great Britain at present the annual production of ammonia is 9000 tons. So that the progress of the ammonia process in our country will only be possible with increased supplies of ammonia at or below present prices. Should the price of ammonia increase much, then it will not be safe to enter on the ammonia soda process as a monetary speculation.

Recovery of Sulphur from Tank Waste.—Time will only permit me to say a few words on this subject. For every ton of alkali produced there is $1\frac{1}{2}$ ton of waste; this contains all the sulphur derived from the sulphuric acid. It is a nuisance in alkali districts, sulphuretted

hydrogen being given off from the waste heaps. To recover the sulphur the most successful method is to treat solution of the oxidized waste with hydrochloric acid; sulphuretted hydrogen is evolved, part of which is burnt into sulphurous acid, which again acts upon the remainder of the sulphuretted hydrogen, thus:—

$$2SH_2 + SO_2 = H_2O + S_3.$$

Upon this principle Mr. Ludwig Mond and Mr. Mactear, of St. Rollox Works, Glasgow, have both devised processes, and it is satisfactory to know that both of them recover a good percentage of sulphur, while they are a success commercially.

The paper was fully illustrated by diagrams of working plant and sheets of equations, showing the decompositions occurring during the various stages; also specimens illustrating the production of common salt from rock salt. Specimens showing the sequence of manufacture of alkali by the Le Blanc process with bye-products and recovered material, and specimens of B.P. alkali were also exhibited. The production of alkali by the ammonia process was experimentally illustrated.

On the motion of the Chairman, seconded by Mr. Crowden, the thanks of the meeting were heartily accorded to Mr. MacEwan for his paper.

A discussion followed the reading of the paper, in which Messrs. Adamson, Crowden, Boa, Hill, and Turnbull took part.

Several queries when then submitted and answered.

Before the meeting adjourned the President announced that the next meeting would be held on December 6, when a debate will take place on the question, "Does a Necessity Exist for Further Legislative Restriction as to the Sale of Poisons?" The affirmative will be taken by Mr. C. F. Henry, and the negative by Mr. W. S. Adamson.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The first meeting of the session was held at the Mechanics' Institute, on Monday evening, November 27, the President, Mr. R. Fitzhugh, F.C.S., in the chair.

The meeting was fairly attended by both members and associates.

The President opened a discussion on the present state of the Association, with respect to the great want of interest and general apathy shown by the non-attendance of members and associates at the monthly meetings and classes, and remarked that unless more personal interest was shown in it, it would eventually collapse.

An animated discussion followed, in which most of the members and associates took part, all urging that the work should be continued, and eventually a proposition was carried that the usual social meeting be held next month, and the future prospects of the Association be further discussed at it.

During the evening Mr. M. Handford was admitted as a member and Mr. Greaves as an associate.

A vote of thanks to the President concluded the meeting.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, November 28, a lecture was given in connection with the above Association, at 4, Halford Street, by Mr. J. Garrett, on "Mercury."

After treating of the heads of the subject, Mr. Garrett went on to speak of the different reactions of mercury, drawing special attention to the change which takes place when a piece of white paper, smeared with the red iodide, is held before the fire, consequent it is supposed upon the conversion of the rhomboidal crystals of the red iodide into octohedra with a square base. Other interesting features of the subject were touched upon, and an instructive lecture was at length brought to a close.

Mr. E. Brice proposed and Mr. Broof seconded a vote of thanks, which was accorded to the lecturer.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the London Committee of this Association was held at the Inns of Court Hotel, High Holborn, London, W.C., on November 24, at 8 p.m. The President in the chair.

The appointment of local secretaries of the Association in London having been discussed, it was moved by Mr. Long, seconded by Mr. Urwick, and unanimously resolved:—"That the appointment of Local Secretaries in the Metropolitan districts be left in the hands of a subcommittee consisting of Messrs. Andrews, Long and Urwick, with power to add to their number.'

It was decided to add the name of Mr. C. B. Allen, of Kilburn, to the London Committee.

The desirability of holding a meeting of the London members of the trade was then considered. On the motion of Mr. Andrews, seconded by Mr. Urwick, it was resolved:—"That the Secretary be instructed to convene a general meeting of the members of the trade resident in London to discuss matters of trade interest; the meeting to be held at the Arbitration Rooms of the Inns of Courts Hotel, Lincoln's Inn Fields, on Wednesday, December 13, 1882, at 8 p.m., prompt."

It was decided that a circular convening the meeting should be sent to the whole of the London trade seven days prior to the meeting and that the agenda should be as follows:—

"1. To consider desirable amendments in the Pharmacy Act, 1868.

"2. To take into consideration the advisability of holding periodical meetings of the members of the Association resident in London.

"3. To discuss generally matters affecting trade interests."

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A Conversazione, in connectionwith this Association, was held at St. James Hall, on Wednesday, November 22, and was well attended by the members and their friends, and also by many of the leading pharmacists of London and the provinces. The excellent programme, which included both vocal and instrumental music, was extremely well rendered, and met with the hearty approval of the audience. In addition to this, through the kindness of the Council of the Pharmaceutical Society, an interesting collection of specimens was lent from the Museum, also a collection of rare chemicals was exhibited by Messrs. Hopkin and Williams. Messrs. Beck and Co. exhibited electrical apparatus, including a powerful plate electric machine, vacuum tubes, etc. Electric bells and telephones were exhibited by Messrs. Mayfield and Co., and also by Mr. W. H. Kerr. Messrs. Swift and Sons again exhibited some of their well-known microscopes.

From the feelings of pleasure expressed by visitors during the evening, the efforts of the Council seemed to be thoroughly appreciated, and a most enjoyable evening was spent.

Parliamentary and Law Proceedings.

Death through an Overdose of Chloral.

On Tuesday, Mr. W. Carter, coroner, held an inquest at the "Alma" Inn, Lower Addiscombe Road, upon th body of Mrs. Eliza Ann Walmsley, aged 48, the wife o Mr. John Walmsley, a commercial traveller.

Mr. Walmsley was the first witness. He said that on Saturday last at about 7 a.m. he went into the deceased's bedroom and saw her lying in bed on he

left side apparently asleep, and there was a pocket-handkerchief over the upper part of her face. He spoke to her but she did not reply, and he then told his son, who had slept with his mother, to get up, after which witness placed a pillow against deceased's back for the purpose of keeping her warm, this being his habit. After witness had had his breakfast he went upstairs again for the purpose of wishing deceased good-bye prior to going to business. Deceased was then lying in the same position, and witness pulled the clothes down a little way, whereupon he discovered that his wife was dead. Witness immediately fetched Dr. Thompson who examined the body and pronounced life to be extinct. Witness had last seen his wife alive at 10 o'clock on Friday night, he not having returned home from business until 9. She was then in the bedroom seated in a chair by a small fire, and she seemed to be in her usual state of health.

Dr. Thompson deposed to being called to Mr. Walmsley's house, and finding the deceased lying in bed dead. The witness's opinion was that deceased must have then been dead for some hours. The left side of the face was in a congested condition. There was no distortion of the features, but they were perfectly placid. Witness could detect no marks of violence. A white medicine bottle was found under the body, and it contained about 3 drachms of liquid, which witness tasted and found to be hydrate of chloral. Witness concluded that deceased had taken this poisonous medicine which produced suffocation. Nothing was found to lead it to be supposed that deceased contemplated committing suicide. Witness had attended deceased for the last twelve months. She suffered from extreme nervous debility, caused by habits of intemperance. Deceased was at times very hysterical, and had bordered upon an attack of *delirium tremens*. Witness was of opinion that deceased took an overdose of chloral. The ordinary number of grains of chloral to be taken by an adult ranged from 10 to 13 grains, but it was clear to witness that the bottle found in the bed had contained at least 100 grains, and he was of opinion that deceased, having found that the ordinary quantities taken by her for several years past to quiet her nerves did not have the desired effect, had gone to different chemists and obtained small quantities, which she had put together in one bottle and taken as a dose, which caused sudden stoppage of the heart's action.

A Juryman asked whether chemists were justified in selling such a medicine as chloral to any persons who asked for it.

Dr. Thompson said there was no quantity specified on the prescription, and a chemist would have to use his own discretion. The question raised by the juror was a very important one, and one which, no doubt, would be ere long inquired into by a Royal Commission.

The Jury, after brief consultation, returned a verdict of "Death through misadventure."

Mr. Walmsley asked the Coroner to kindly add to his deposition his protest against chemists selling drugs of the description of chloral in the wholesale way it had evidently been supplied to his wife. With regard to this particular dose it seemed deceased sent her little boy for it, and he had not the least difficulty in obtaining it.

The Coroner said he was sorry, but under the peculiar circumstances of this case he did not see how he could comply with his request.—*From a Local Paper.*

Attempt to Poison with Iodine Liniment.

On Thursday, November 23, Elizabeth Taylor, aged 13 years, was brought before Messrs. Coleridge and Toller, Ottery St. Mary magistrates, charged on remand with administering poison to Norman Skinner, a child 13 months of age.

On Wednesday week Taylor fetched the child from her bedroom in the morning, and about ten minutes afterwards she came back exclaiming, "I've been giving baby some liquorice." Mrs. Skinner then noticed something brown running from the child's mouth, and on closer inspection she saw it was iodine. Upon asking Taylor what she thought would become of her, she replied, "I shall not be hung, as my father will pay some money." The girl then ran into a front room, took a vase from the mantelpiece, and threw its contents into the grate, wiping out the vase with her apron.

Sarah Jane Sanford said that Elizabeth Taylor was her fellow servant, and they slept in the same room. The bottle containing iodine, now produced, was hers (witness's). She had been using it for a swollen knee. On the Wednesday she found that some of the stuff was gone, and the label had been moved further down. She saw dark marks on the child's clothes.

Dr. Pullin, of Sidmouth, said that he saw the child and noticed that its chin and clothes were discoloured with a brown colour. The lips were as if burnt, and the inside of the mouth was also brown. The prisoner and Mrs. Skinner were present. He told the girl she ought to say what she had given the child. He asked this so that he might know how to treat the case. Taylor then said, "I first gave him benzoline and then some stuff that Jane uses for her knee." Mrs. Skinner then fetched the bottle produced, and the prisoner said, "Yes, that's the stuff." On the bottle was a red label marked "poison." He asked her how she gave it to the child, and she replied, "Out of that," pointing to a vase on the mantelpiece. Iodine was a poison; its action was scalding, and thirty drops given to a child would prove fatal. He did not think the child had swallowed any. The spots on the child's dress and girl's apron now produced were caused by iodine. On his asking the girl if she knew what "poison" meant she replied in the affirmative.

Prisoner reserved her defence, and was committed to take her trial at the ensuing Quarter Sessions at Exeter. —*Western Weekly News.*

Poisoning by Carbolic Acid.

The Plymouth Borough Coroner (Mr. T. C. Brian) on Monday, November 20, investigated the circumstances attending the death of Lawrence Charles de Vries Hall, aged 4 years, son of Captain Hall, late of the Royal Mail Steamship service.

Emily Roose, under nurse, stated that on the previous afternoon the deceased went from the dining-room into one of the spare bedrooms. She heard him scream, and she immediately ran upstairs, and found him standing foaming at the mouth. Mr. Budd, surgeon, was sent for, but before he arrived Captain Hall concluded from the smell that the deceased had taken carbolic acid. Witness on again going to the spare bedroom found a 12oz. bottle containing carbolic acid on the washing stand. The acid was kept as a disinfectant, and was last used about two months ago on the occasion of a death occurring in the house. On Sunday evening the child appeared to be much better, but on Monday morning he grew worse, and died about eleven o'clock.

Mr. George Budd stated that he found the deceased in a state of extreme collapse. The odour of carbolic acid was very strong, and in fact anyone standing three yards from the child could smell it. He administered about a quart of olive oil, as well as a quantity of ipecacuanha wine, to induce vomiting. The child vomited very freely, and witness thought all the acid had been removed. The child's face presented a better colour; but from the first he (the doctor) had no hopes. If he had been in attendance even immediately after the child had taken the poison the result would have been the same, for the acid was so strong. It was his opinion that a blue bottle with a red label, though the orthodox pattern for poison bottles, was too attractive for children.

The Jury returned a verdict of "Death from accidental poisoning," adding that in their opinion there was no blame due to any person.—*Western Weekly News.*

Obituary.

Notice has been received of the death of the following:—

On the 10th of November, Mr. John Tombs, Chemist and Druggist, Burlington Street, Liverpool. Aged 60 years.

On the 20th of November, Mr. John Taylor, Chemist and Druggist, of 14, Clarence Road, Leytonstone, E., formerly in business in Wakefield for many years. Mr. Taylor was a Member of the Pharmaceutical Society from 1853 to 1876, and for several years held the post of Local Secretary at Wakefield.

On the 27th of November, Mr. John Stone, Pharmaceutical Chemist, Fore Street, Exeter. Aged 85 years. Mr. Stone had been a Member of the Pharmaceutical Society since 1853.

Notes and Queries.

[744]. Potash Powders.—I frequently make "potash water" by adding to the ordinary charge of bicarbonate of soda and tartaric acid, ℈iij pot. bicarb. for Oij and ℈iv for Oiij size.—W. Lee.

[744]. Potash Powders.—If "Pulvis" would procure a circular sent out with Fevre's seltzogenes, he will find a good deal of information, and the following appears to be an answer to his query. "To make potash water add to the lower globe 4 scruples of bicarbonate of potash for 3 pint size," that will be to the upper globe in Briet's gazogene. I think "374" must have misunderstood the query when he says, "Substitute pot. bicarb. for sodæ bicarb. in ordinary gazogene charges." What is the use of that when all that gets into the finished water from the charges is the evolved gas?—J. H.

[745]. Boracic Lint.—W. L. P. will find in Squire's 'Companion,' 13th edition, p. 7, under Acid. Boracic., the following:—"Lint, dipped in a boiling saturated solution (of boracic acid) and dried, is used as an antiseptic dressing for wounds and ulcers."—J. H.

Correspondence.

The Proposed Pharmacy Curriculum.

Sir,—Although the present date may seem a late one for a contribution to the discussion of a subject prominently brought forward some months back, yet the importance of that subject will, I trust, render excusable my request for a space in your Journal for the insertion of this letter, my tardiness in writing arising from my inability to do so before, since Professor Attfield's pamphlet and the *Pharmaceutical Journals* containing the proposed innovations were received by me, some in Australia, some in New Zealand, and my desire to give fair and unbiassed thought to the subject before venturing to express an opinion was the reason of my not inditing an epistle from those antipodal lands.

Before offering any criticisms or suggestions concerning the proposed innovations, I would like to state that, in the main, I am thoroughly at one with the projectors of a pharmaceutical curriculum; the more perfect harmonizing of pharmaceutical education to examination is in my opinion desirable, I would even add, under the present state of affairs, necessary. But if a curriculum is to be established, it should certainly be a compulsory and not a permissive one. The recognition of a permissive curriculum by the Boards of Examiners would be an act of injustice, in that it would give an unfair advantage to those schools which would be officially recognized for the purpose; it would be almost enticing students to those schools by the offer of a power, viz., a schedule detailing that they had passed through a curriculum, which would act as a lever in assisting them through their examinations. Such a plan would mean the establishment, not of a permissive curriculum, but of a morally compulsory one on a basis the fairness of which would certainly be questionable. If a system inimical to true pharmaceutical education does exist, then no half measures should be employed in dealing with it. The recognition of permissive curricula would either attract the majority of or all students to the schools recognized for the purpose, in which case a compulsory system might have been established at once, or the system inimical to true education would still flourish, in which case a compulsory system would have to be adopted. I infer—perhaps wrongly—from Professor Attfield's arguments, that he reasoned to himself that the recognition of permissive curricula by the examiners would bring about a gradual and lingering death of the system he deprecates, by wounding it in an unguarded quarter, and so placing it *hors de combat*. But such an action would be an ungenerous one; in instituting reforms, common fairness and feeling for others should always be considered.

I certainly agree with Professor Attfield, that the recognition of compulsory curricula is to be desired for the furtherance of true pharmaceutical education; if the pharmaceutical body, as a whole, is of the same mind, I, for one, cannot see the impracticability of carrying out such a step.

In connection with the adoption of a compulsory curriculum, it is important that due weight should be given to the opinions of the teachers concerning the actual work done by the students whilst under their guidance, otherwise the system will be labouring under the same ban as that with which the English medical educational system is afflicted; for that system provides that a student must attend a certain number of lectures, demonstrations, etc., but does not require to know that he has benefited by such attendance or taken advantage of his opportunities, previous to presenting himself for examination. The consequence is that many a student goes up for examination in a far worse condition than if he had not passed through a compulsory curriculum at all, for the attendance at the requisite number of lectures, demontrations, etc., will probably have imbued him with the false idea that he is, of necessity, ready for the examination. I have spoken with many of the lecturers and teachers at the medical schools, concerning their compulsory curriculum, and they all agreed in deploring it in its present condition, maintaining that unless weight is given to a teacher's opinion of a student's fitness for presenting himself for examination, the mere attendance at a certain number of lectures, etc., is useless, nay, even detrimental. It is true that at most of the medical schools the teachers, from time to time, examine their pupils, so as to gauge their knowledge, and will, if they find them deficient, refuse them their schedules, without which they cannot present themselves for examination. Such refusal, however, is not, I believe, legal, provided the student has simply attended the requisite number of lectures, etc. I, therefore, most strongly urge that in the event of a compulsory pharmaceutical curriculum becoming established, due power be given to the teacher to ensure thoroughness of work in his pupils, and so prevent the frittering away of a certain length of time, which by the unthinking medical student is often regarded as a purgatory to be endured previous to the examination. In the present state of pharmaceutical education, it would be utterly out of the question to think of delegating to pharmaceutical teachers the additional duty of acting as public examiners, even supposing the present paucity of eminent teachers did not render such a scheme impossible, but I must certainly dissent from Professor Attfield's statement, on p. 88 of his pamphlet, "that with regard to the question of education and examination being carried on by one and the same man, or body of men, the general impression is that certain weaknesses of human nature render such a course undesirable," for how is it that the plan works so admirably in connection with the various medical examining bodies, where, as a rule, the examiners are selected from the professors and lecturers actually engaged in teaching at the different medical schools?—the logical inference being employed, that the man engaged in teaching is the man best fitted to examine. At such examinations a teacher does not examine his own pupils, that task being dele-

gated to the other examiners, and as is well known, such a system works perfectly, an accusation of unfair bias on the part of any of the examiners never having been made.

The late President of the Pharmaceutical Society, in discussing the proposed curriculum at the April Council Meeting, said, "He believed a large portion of the change had been made with a view to abolish what was termed cram, but he thought it was to a great extent a bogus, and that there was a great deal more noise about it than it really deserved." That cram does exist to some extent cannot be denied, but I also think that to a great extent it is a phantasm, existing in the minds of those who so fiercely denounce it. Special, conscientious, and thorough preparation for examination has no association whatever with cramming, for it is the same kind of teaching that is employed, in the scientific subjects at least, at all the recognized medical schools. Moreover, special preparation for examination by tutors who to some extent know from experience the areas to be covered in connection with the different subjects is the necessary outcome of the want of a comprehensive syllabus defining the range of the examinations. Deploring, as I do, the absence of such a guide, both to the teacher and the student, for the syllabus at present issued in connection with the Major and Minor examinations is all but useless, I should welcome some such a syllabus as that detailed in the Report of the Special Committee appointed to consider the inter-relation of pharmaceutical education and examination, allied with, if necessary, a compulsory attendance at lectures and laboratory work, since it would greatly lighten the burden of the teacher, rendering his work much more satisfactory both to himself and to his pupils.

I emphatically and honestly deny that preparation for examination necessarily consists, as Professor Attfield asserts, in the tutor getting hold of the examination questions and wrapping their answers up in a course. To teachers who endeavour to conscientiously prepare their pupils for examination such an assertion is ungenerous.

In my opinion nothing has contributed more to the fostering and development of preparation, and also of cramming, in connection with the pharmaceutical examinations, than the absence of a comprehensive syllabus indicating the range and limits of the various subjects. In the absence of such a guide a teacher is compelled, even against his inclination, to watch the examinations in order to gain an idea of the areas covered by the different subjects, the boundaries to which are to a great extent left to the will and fancy of the examiners. In making this statement—that the examiners possess the power of fixing or extending at their will the limits of the various subjects,—a statement which I believe no one who gives serious thought to the matter will contravene,—I wish to record that no disrepect nor impliance of want of faith is intended, either towards the examiners as a body or to any of them personally; that they endeavour to perform their duties conscientiously I am confident, my feeling is only that of commiseration for them that their duties are rendered so onerous, so tormenting and so perplexing, by the absence of a sufficiently comprehensive syllabus, indicating the range of the different subjects in which they examine. The absence of such a syllabus not only puzzles the teacher as to the exact nature and area of the ground over which his teaching must be spread, but is the cause of the frequent cavilling heard amongst candidates as to the right of such and such a question being asked, remarks equally unpleasant for both examiners and teachers to hear. Why have the pharmaceutical examinations been rendered conspicuous by the absence of a syllabus fitted to guide examiners, teachers and students? In connection with other examinations to which no compulsory system of education is attached, a comprehensive syllabus is issued, definitely indicating the range and limits of the subjects of the examination.

Of the recommendations suggested by the Special Committee appointed to consider the inter-relation of pharmaceutical education and examination, I only now wish to make a few remarks concerning "recommendation 4." That the examination should be divided is much to be desired, but the division proposed in recommendation 4 is, in my opinion, a most unfortunate one. I perfectly agree with Mr. Carteighe's remarks at the April Council meeting, "that it is quite practicable for the first part to consist of prescriptions, practical dispensing, and pharmacy, and then for the candidate to go in for five months' study and come up at the end for the three scientific subjects," and I go further in thinking that such a division of the examination would be the only harmonious one that could be effected. It seems to me a perfect anomaly that a man should attend lectures, etc., on scientific subjects for five months, and then be compelled to wait six months before he could present himself for examination in those subjects. At the same Council meeting Mr. Symes said, "that the Committee found it was only following the practice of other bodies to give a young man his scientific training somewhat before they gave him his technical training." If the members of the Committee had in their minds at the time the system of medical education, I can only reply that though the deduction is correct, the application is both untenable and illogical. It is true that in the medical system of education the scientific training does precede the technical, but the medical student has not passed through a long period of technical training such as that undergone by the pharmaceutical student during his apprenticeship; the medical student commences his scientific training with no technical knowledge whatever. Moreover, as soon as the medical student has received his scientific training, he can go up for examination in the scientific subjects, and as soon as he has received his technical training, he is examined in the technical subjects. If, therefore, the medical system of education is to be taken as a guide, it would be but logical to say that when a pharmaceutical student has received his technical training, that is, when his apprenticeship is finished, he should be examined in the technical subjects, and that his examination in the scientific subjects should immediately follow his scientific training, without the unparalleled institution of an unseemly gap of six months between his scientific training and his examination in the scientific subjects.

173, *Marylebone Road, N.W.* A. P. Luff.

Singleton's Ointment.

Sir,—Having at last an opportunity, I will endeavour to answer the letters respecting citrine ointment which have appeared in the Journal during the past three weeks.

The points at issue seem to be:—

1st. What is the composition of Singleton's eye salve? and

2nd. Has that ointment always been prepared from the same formula?

Before answering these questions, I should like to refer incidentally to two minor subjects Mr. Henry Brown mentions. If he will be kind enough to refer to the old London Pharmacopœia, he will find the ung. basilicon and all the ointments of which I gave the formula in my paper are called by the name ung. citrinum; and also if he will carefully read the title of my paper he will probably see that it is 'The History of Citrine Ointment,' not 'The History of Eye Ointments in general, and Plato's in particular.'

Having myself examined Singleton's ointment, I can decidedly state that it is an ointment of HgO, without a trace of As_2S_2 or As_2S_3, although I am ready to yield the point of yellow or red oxide to Mr. Tanner.

In respect to the second point, I think it is very easy to argue, as Mr. Saul has done, on the assumed infallibility of Dr. Paris and others, but I ask, does Mr. Saul think it likely that Dr. Paris analysed, or even prepared, one-half of the preparations mentioned in 'Pharmacologia?' Indeed, I think it very probable that some of the formulæ may have been written on the authority of others, as almost every author of such a book would do more or less.

Again, the very fact of Christison and others, looking upon it as citrine oiutment, shows clearly, either that they often jumped at conclusions without any sound foundation, or, if they did examine "eye salve," that it was mercurial.

For my own part, I do not see how the old composition can be arrived at with any degree of certainty; but I ask, would the proprietor of "Singleton's Golden Eye Salve" have altered the composition, considering what a large sale his preparation had gained? Again, arsenious sulphide in the proportion of 2 or 3 grs. to 1 ounce (as used

for the eyes) would not give sufficient colour for it to be mistaken for citrine ointment, unless some further colouring matter were added.

R. A. CRIPPS.

Sir,—The paper on "Singleton's Ointment," to which Mr. Tanner probably refers, was read by Mr. W. Jardine, at a meeting of the Glasgow Chemists' Association. in February, 1867, and was printed in the *Pharmaceutical Journal*, [2], vol. viii., p. 591, and shows very clearly that whatever Singleton's ointment may have been originally, it is now an ointment of red oxide of mercury.

Manchester. W. WILKINSON.

Sir,—I think Mr. J. E. Saul may be congratulated on having made out a pretty strong case in favour of his theory that Singleton's golden ointment, as originally prepared, was an ointment composed of yellow sulphide of arsenic; at least this is the conclusion one must almost inevitably come to in the face of such testimony as he brings forward in his letter on p. 140. It is inconceivable certainly that an eminent authority, as Dr. Paris undoubtably was, should make such a definite statement as to its composition, on mere conjecture and without having seen the ointment in question. But what shall we say of Dr. Christison ('Dispensatory,' 1st ed., p. 531), who, in speaking of citrine ointment, says it was introduced for the purpose of "imitating as exactly as possible a nostrum well known by the name of the golden eye ointment?" Now if the golden ointment of that period were really an ointment of arsenious sulphide, surely there would have been no difficulty in determining that fact and framing the formula accordingly; we must, therefore, either look upon the efforts of the compiler at imitating it as futile, or suppose that this Proteus had again changed its shape. It would be an interesting, but perhaps difficult task to trace out when it first differentiated and subsequently became what we now find it.

Mr. Saul must pardon me for reminding him that the object of my letter to the Journal was not so much to show what golden ointment was, as what it is, and he will find that the latter portion of my letter indicates an explanation of the discrepancies which have arisen as to its composition. Cooley, in 1855, appears to have been the first to show that it is composed of red oxide of mercury and not arsenious sulphide as generally supposed. In 1877, Mr. R. J. Downs, in a paper read before the Irish Pharmaceutical Society, and published in abstract in the *Chemist and Druggist*, of April 14, 1877, p. 138, gives the result of his examination of a pot of Singleton's golden ointment, which establishes its almost perfect identity with the ung. hydrarg. oxid. rub. of the B.P.

Mr. Cripps will, I am sure, pardon me for taking up the cudgels on his behalf, but before concluding I should like to point out that both your correspondents, Mr. Henry Brown and Mr. Saul, have, unintentionally perhaps, misquoted him. Mr. Cripps nowhere says "Singleton's eye salve was an ointment of yellow oxide of mercury" (Mr. Brown); nor, again, "was the same at the time to which Mr. Cripps referred in his paper" (Mr. Saul). What he did say was that citrine ointment was not satisfactory as an imitation of golden ointment, this latter "being an ointment of yellow oxide of mercury." The difference in meaning is sufficiently apparent.

Tottenham High Cross. ALFRED E. TANNER.

The composition of this preparation has also been the subject of some correspondence in the *Lancet*, to which journal Mr. Napier, of Guildford, has forwarded the following "original receipt," which he says was obtained about forty years since from the occupier of the house in Fleet Street, nearly opposite St. Dunstan's Church, where Singleton lived:—

℞ Hydrargyri, ℥ss.; acid. nitric., ʒvss.; butyri (without salt), ℥vj.; oleum olivæ, ℥iv. Hydrargyrum in acido primum liquus; dum liquorum adhuc calentum, butyro et oleo simul liquefactes: misce.—N.B. This is half diluted.

Mr. Napier says, "It requires care in making and to be well stirred until cool, when it will come out of a brilliant golden colour. To make the ointment full strength the butter and oil must be reduced one-half."

[*** We think that sufficient space has now been accorded to the discussion of this subject, and as it is not probable that any greater certainty will be attained as to the original composition of the ointment the controversy may well be dropped.—ED. PH. J.]

IMPURE AMMONIUM BROMIDE.

Sir,—A somewhat curious case of poisoning having come under my notice a few months since, it has occurred to me that a short account of it might be of interest to your readers and also be a warning to pharmacists of the necessity of assuring themselves of the purity of the chemicals they purchase.

A prescription (written by a physican known to me) consisting of ammon. bromid. and sal volatile in ordinary doses, was dispensed at a continental pharmacy. The first dose, instead of producing the usual effects, caused violent sickness, the vomit being of a peculiar red colour, accompanied by all the symptoms of irritant poisoning. A portion of the mixture was brought to me by the doctor in question, who went over to investigate the matter. Upon making an examination of the mixture, I found, in addition to ammon. bromid. in solution, there was an insoluble precipitate, amounting to about 1 grain per fluid ounce of the mixture, which, upon analysis, I proved to be carbonate of cadmium. This result seemed so improbable, that a further portion of the mixture was taken by the physician to a well-known analyst, who confirmed my report.

Subsequent inquiry has brought to light the following facts:—That the principal fault lay with the manufacturers, who have since acknowledged that they found the whole batch of ammon. bromid., of which that used by the continental pharmacist was a part, had through the carelessness of their workmen become contaminated with a cadmium salt of which they were large makers.

I have since learnt that cases of poisoning by cadmium are rare. In several books that I consulted, I could find nothing about its physiological effects. I am told the colour of the vomit is highly characteristic.

1, *Southwick Street, Hyde Park.* EDW. G. HOGG.

A POINT IN ETHICS.

Sir,—On page 379 you quote from the *Standard* a report in which the Assistant Secretary to the Chemists and Druggists' Trade Association is represented to have said that he "was obliged to tell an untruth in order to detect the defendant." I have looked in vain in the succeeding numbers of the Journal for any contradiction or explanation of this curiously bald statement. That some satisfactory account of the matter will be forthcoming is, I take it, beyond doubt; for the suggestion implied, that when the interests of the Association conflict with truth, it is truth that must yield, is too monstrous to entertain. Without judging this case, it may not be out of place to affirm that a good cause cannot be served by untruth. Of that I am sure the officers of the Trade Association are as fully convinced as I am.

Ryde. HENRY H. POLLARD.

Conway.—For a method of preparing zinc bromide see *Pharm. Journ.*, [3], vol. x., p. 244.

Constant Reader.—Pharmacy Acts regulating the practice of pharmacy are in force in Victoria, New South Wales and Queensland; but we believe that all three examining boards (that in Queensland is a medical board) receive the certificates of the Pharmaceutical Society of Great Britain in lieu of a fresh examination.

H. Andrews.—Johnson's 'How Crops Grow,' edited by Professor Church and Professor Dyer.

Associate.—Hager's 'Handbuch der pharmaceutischen Praxis.'

H. H. Pollard.—Probably Professor Barff's process, which consists essentially in producing a coat of magnetic oxide on the iron (see *Pharm. Journ.*, [3], vii., p. 702).

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Abbot, Bruce, Cantrell and Cockrell, Hayward, Tyler and Co., Spondalium, John, Y. L., and S. G.

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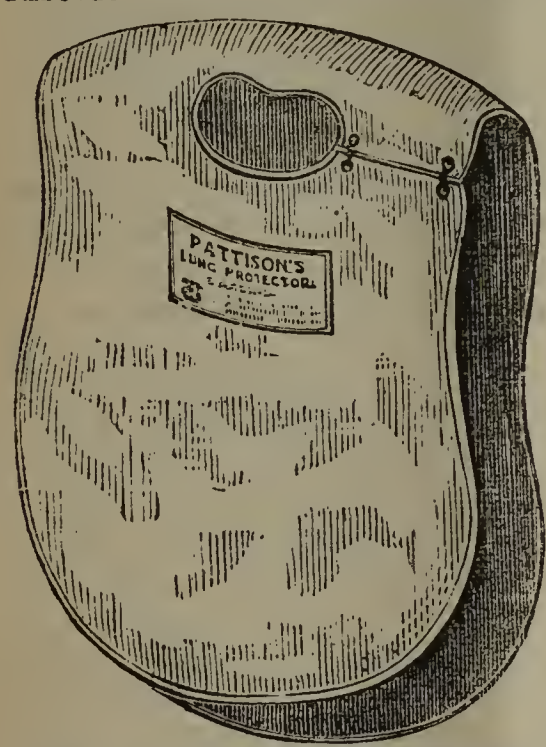

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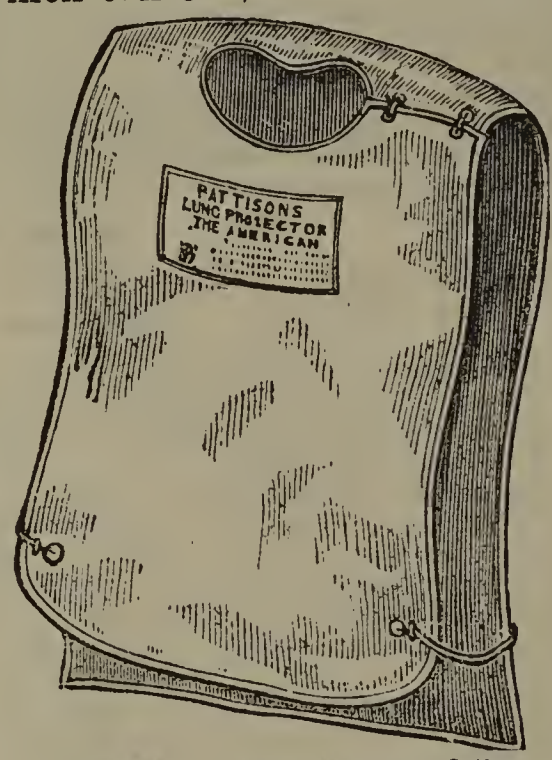

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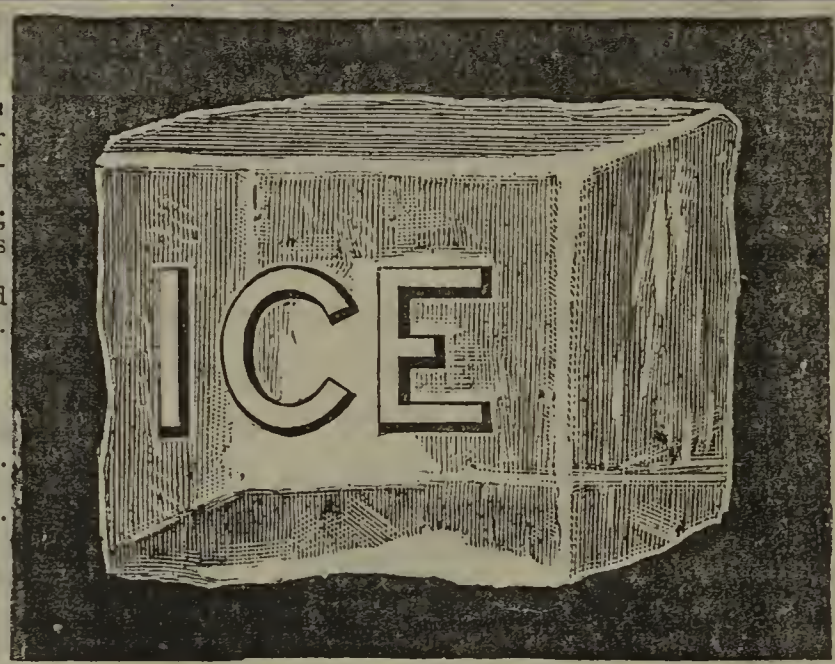

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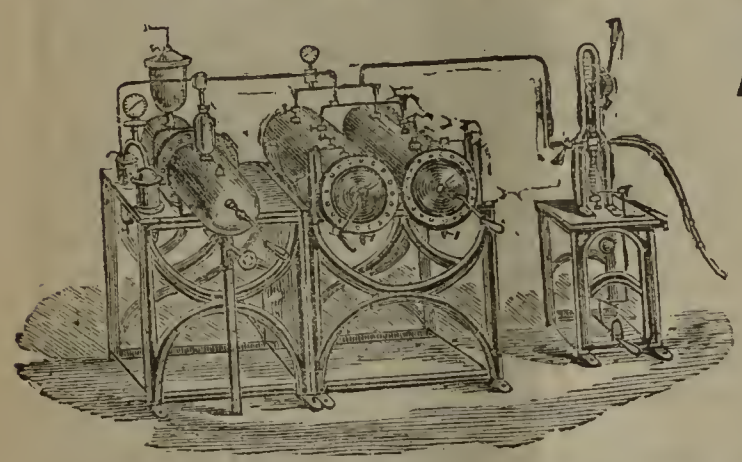

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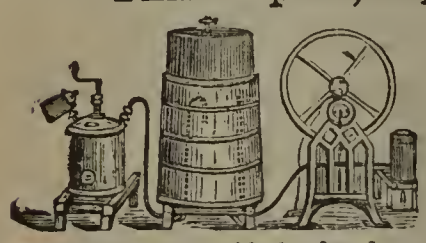

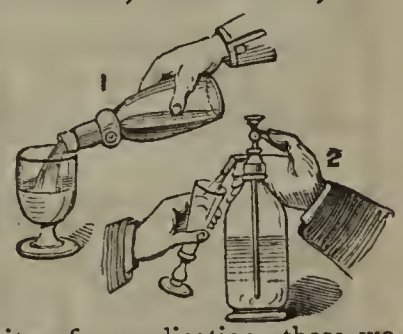

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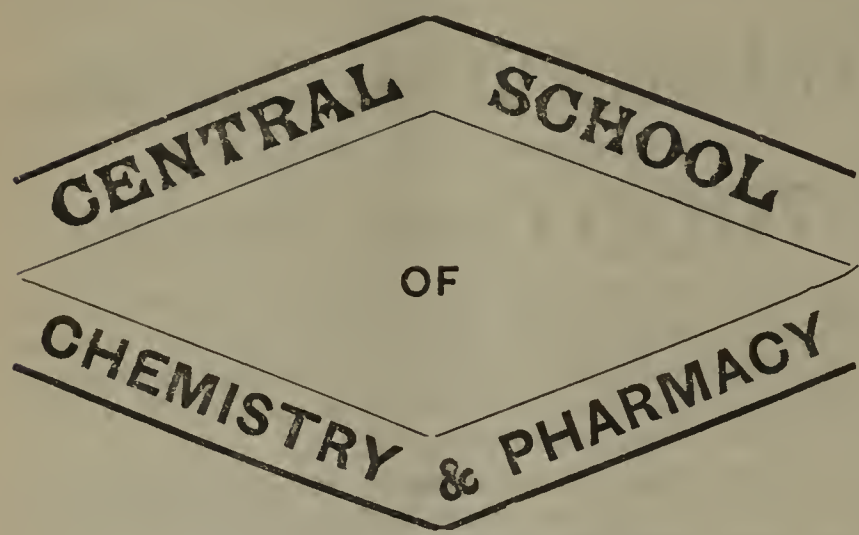

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,, C. E. O. Betts.
,, W. Bray.
,, A. Cardwell.
,, H. C. Dadson.
,, F. G. Deacon.
,, G. S. Dunn.
,, C. P. Dye.
,, W. A. Easte.
,, J. F. Gummow.
,, T. E. Heynes.
,, R. D. Millward.
,, D. Rees.
,, T. Hudson.
,, A. Pell.
,, R. W. Rees.
,, F. G. Treharne.
,, G. A. Yates.

From all other Sources combined, 11.

Mr. H. S. Cooper.
,, M. Dodsworth.
,, T. Fawssett.
,, F. W. Maddox.
,, W. F. Norman.
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Licensed Valuers and Transfer Agents,

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4. LONDON, W.—Prescribing, Dispensing, Retail and DENTISTRY. Returns £728. Net profits £373. Price £650. Thorough investigation courted.
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Messrs. T. & T. have also a long list of other Businesses on their books for disposal. Gentlemen seeking investments are respectfully requested to give particulars of their requirements.

No charge is made to purchasers.

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Member of the Pharmaceutical Society,

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9. SUSSEX.—Through death of proprietor. Small Family TRADE. £250.
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18. LONDON, W.—Select Family TRADE. Price £200.
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Midland Counties' Transfer Agency.

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3. LONDON, N.—Retail and Dispensing BUSINESS. Situate in main road. Returns £700 yearly. Good Proprietary Articles attached. Good house and lease. Rent low. Price about one year's returns.
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"New York Medical Journal," *August* 1880, Dr. F. Weir, *in Lecture delivered to the College of Physicians and Surgeons, New York.*

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Of all Chemists, 1s. 6d. *and* 2s. *per bottle. Ordinary Dose, a Wineglassful.*
It is most efficacious when taken in the morning fasting, warmed to a temperature not below 60°, or when an equal quantity of hot water is added to it.

London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. and A. Churchill, 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 650.] SATURDAY, DECEMBER 9, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

BENEVOLENT FUND.

For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

NOTICE IS HEREBY GIVEN that a Meeting for the ELECTION of SIX ANNUITANTS on the Benevolent Fund of this Society will take place on Friday, the Fifteenth day of December next, at 12 o'clock precisely.

By Order of the Council,

ELIAS BREMRIDGE,
Secretary and Registrar.

Persons subscribing on or before the day of Election will be entitled to vote thereat.
October 4th, 1882.

There are at present *thirty-six* annuitants, receiving £1180 per annum, and casual relief is also granted, amounting to between £600 and £700 per annum, making a total annual expenditure of upwards of £1800.

The following is the scale of pensions:—

£30 per annum to pensioners under 65 years of age, and £35 per annum to pensioners 65 years of age and upwards.

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of	
Half-a-crown are entitled at each election of Annuitants to	ONE Vote.
Five Shillings	TWO Votes.
Half-a-guinea	FIVE Votes
One Guinea	TEN Votes.
And to increase in the same proportion.	
Five Guineas are entitled to	FIVE Votes for life.
Ten Guineas	TEN Votes for life.
And to increase in the same proportion.	

Donations or Subscriptions are earnestly solicited.

Cheques and post office orders to be made payable to ELIAS BREMRIDGE.

WANTED. — The PHARMACEUTICAL JOURNAL for January 11th, 1873. Full price will be given by the Secretary, 17, Bloomsbury Square, W.C.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

NORTH BRITISH BRANCH,

119A, GEORGE STREET, EDINBURGH.

EVENING MEETING.

The next Meeting will be held in the Society's Rooms, on Wednesday, 13th instant, at 9 o'clock.

Mr. ALEXANDER NAPIER, President of the Branch, in the chair.

The following Papers will be read:—

"Notes on the Pharmacopœial Extracts of Aloes and their preparation." By ROBERT AITKEN.

"Preparation of Syrupus Ferri Phosphatis by a new method." By DANIEL GORRIE.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIRST SESSION, 1882-83.

CHEMISTRY AND PHARMACY. .....Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY .....Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

THE LECTURES ON
CHEMISTRY AND PHARMACY

Comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.

2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.

3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects will be fully illustrated with experiments, diagrams and specimens, and every lecture will be followed by an examination of the class on those subjects which have been previously treated of by the Professor.

With the view of connecting the lecture teaching with the instruction given to the practical class in the laboratory, and of enabling the Professor to increase the number of his experimental illustrations, the Demonstrator of Practical Chemistry will assist at these lectures and at the examinations.

Instruction in Practical Dispensing will be provided for those Students who have previously had but slight means afforded them of becoming skilled in such operations.

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Comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.

2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.

3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures will be very fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *vivâ voce* examination is held after each Lecture. It is hoped that all pupils will attend these examinations.

INSTRUCTION IN
PRACTICAL CHEMISTRY

Is conducted in the Laboratory by the Professor and Demonstrator. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date.* A Junior course occupies about 5 months. A complete course of instruction, including the higher branches of Quantitative Analysis, occupies ten full months, and dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for Admission to the School, for Prospectuses, or for further information, may be made to the Professors or their Assistants in the Lecture Room, or Laboratories, 17, Bloomsbury Square, London, W.C.

THE CHEMISTS' SEVENTEENTH ANNUAL BALL

AT

WILLIS'S ROOMS, KING STREET, ST. JAMES'S,

ON WEDNESDAY, 10*th JANUARY,* 1883.

Stewards.

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H. W. Backhouse
Geo. Barclay
W. R. Barker
M. W. Bell
W. Bush, Junr.
I. Bourdas
A. W. Flux
W. H. Francis
E. Gilbertson
E. Harvey
T. H. Hills
Walter Hills
W. Hodgkinson
W. K. Hopkin
E. Horner, Junr.
Charles Hunt
J. H. Jagg
J. R. Jewell
Dr. Kernot
W. Langton
G. Lansdown
J. Lorimer
T. Lynch
Charles Maw
Albert Morson
J. W. Parker
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W. Pike
S. Plowman
A. W. Postans
A. C. Preston
Clifford Probyn
J. G. Richardson
J. Robbins
G. W. Sandford
F. S. Saunders
W. Smith
A. H. Squire
P. W. Squire
J. Thompson
R. B. Warrick
J. Williams
G. S. V. Wills

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T. C. W. MARTIN, 36, Camden Square, N.W.
JOHN F. SAVORY, Hon. Secretary, 143, New Bond Street, W.

Attention is drawn to the following resolution of the Committee :—

"That with a view to further secure the comfort of those present at the Ball, and to avoid the possibility of overcrowding, the number of tickets be strictly limited to 350, *and that all applications for tickets must be accompanied by a remittance."*

TICKETS ; Lady's, 12s. 6d. ; Gentleman's, 17s. 6d.

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1883.

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The contents comprise, besides a number of legal articles specially written for this Diary, all the information usually found in an Almanac; statistical information; tables of solubilities, boiling points; weights lost in drying drugs; botanical calendar; list of London doctors, hospitals, museums, Government and Legal Offices, &c.; and nearly a hundred miscellaneous formulæ and notes.

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FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XVIII.

THE CHEMISTS' AËRATED AND MINERAL WATERS ASSOCIATION (LIMITED).

THE annual meeting of the Company was held at Anderton's Hotel on November 8, Mr. Horace Davenport in the chair. About 20 members were present.

The report submitted to the meeting stated that the directors considered the present position of the Association satisfactory. The summer had been an exceptionally bad one for the mineral-water trade, but the returns had nearly equalled those of the previous year, when a large sum was expended in advertising.

The Harrogate branch had proved a great boon to northern members, supplying them with the manufactured waters; its working showed a fair and increasing profit, but the sale of the Kissengen and other splendid natural waters had been disappointing.

The services of a salaried manager had again been dispensed with, the committees (ably assisted by the secretary) having discharged the managerial duties.

The only medal given for B.P. aërated waters was awarded to this Association at the International Food Exhibition, London, 1881.

The directors had arranged with the L.P.D.C. to collect free all cases of empties which, when full, had been delivered by them. Country empties are now collected from the Southern and Eastern London goods stations at 2d. per case. This charge the Association will be in a position to pay when the number of members is increased to 750. The number of members was now 615. It was 540 on Oct. 1, 1881, and 436 on Oct. 1, 1880.

Messrs. Clark, Son & Platt, and Messrs. Brown, Gould & Co., had generously allowed a large discount from their advertisement accounts, a discount which practically sacrificed their profit, thus saving the Association a considerable addition to preliminary expenses.

The directors recommended that a dividend should be declared at 9d. in the pound, or nearly 4 per cent., which would absorb £305 16s. 3d., that 10 per cent. should be written off the preliminary expenses (£310), £200 off plant, £50 off the Harrogate concession, and that £231 6s. 7d. balance of profit should be carried forward.

The various accounts submitted showed sales in London amounting to £4321; in Harrogate, £1125 3s. 4d. The gross profit in London was £1681 18s. 11d., and in Harrogate £447 8s. 7d. Deducting general office expenses, directors' fees, rent, loss on bottles, advertisements, and sundry other expenses, London showed a net profit of £695 12s. 8d., and Harrogate a net profit of £151 13s. 5d.

The CHAIRMAN said they were a small party, as usual, and he supposed the small number indicated that the members generally were satisfied with the conduct of their affairs. It was not a merely formal expression to say they had pleasure in submitting the present balance-sheet. It was a great satisfaction that they could at last declare a dividend which had been honestly earned. It had been a very bad season for the mineral-water trade; indeed, the summer had been almost worse than the winter. But by being very careful about the expenses they were able to show a handsome profit. The results were even better than they seemed. Last year, in consequence of their extensive advertising, they had sold a much larger quantity of rubine than they had sold this year; but they had made this up by greater sales in soda, lemon, &c. Thus, as he had said last year, they were indirectly getting the benefit of their new shareholders, who had joined them in order to be able to supply their customers with rubine. What little advertising they did now was debited to profit and loss account. As an indication that the season had been generally a bad one, he mentioned that a swimming bath in which he held some shares had lately sent him a notice that they would not be able to pay the interest this year on their debentures. Mr. Wilson, who had come up from Harrogate, would tell them about the Harrogate branch. He was much disappointed that the Kissengen water had not been a greater success. It seemed that they had not made a good investment in taking that, and he thought it was due to the fact that members would not take an interest in it. He supposed nothing of that kind would succeed unless it came from a foreign land. He hoped the members would still trust their directors and secretary to carry on the business. They did not grudge trouble if their labours were appreciated. The shareholders did seem now to understand better than formerly the system on which they were trading. But they still had letters complaining of being asked for money, and regarding the directors as a firm with whom they were dealing, and not as merely the representatives of themselves. They could not carry on the business without cash payment. He had taken a particular interest in this company, because its success showed that chemists could be induced to work together shoulder to shoulder. He believed many more would join them now that they could see that there were no financial dangers. Some travellers had tried to do them an injury. He knew of one in particular—and at one time he had thought of getting up the necessary evidence for a prosecution—who had told chemists that the Association could not last. But he thought it best to let the accounts speak for themselves. As to the application of the profit, they could, of course, be very heroic and apply all of it to the reduction of the preliminary expenses, but he thought that would be hardly fair to those who had had their money in it all the time. It would be putting new shareholders on the same footing as old ones. If the report was adopted, he would like it understood that the dividend would not be paid until January 1, and then, to save expenses, they proposed in all cases where they had accounts open with their shareholders to credit the account with the amount of the dividend. He moved the adoption of the report.

Mr. URWICK seconded the motion, and said that, while the success of the company was satisfactory, he considered he had had a very good dividend all along by the extra profits he had made by selling these waters. He recommended the issue of fly-sheets recommending the waters.

Mr. NICHOLLS thought that would be a wrong principle. He printed his own advertisements on the waters, and he thought others should do the same. He also urged that rubine should be put up in syphons again, as it was when it was called "bark beer." Teetotallers were increasing, but they would not buy drinks which cost them 6d. for a single draught. Mr. Nicholls remarked on the large quantities of bottles, syphons, estimated at £2002. The general office expenses (£480 in London and £147 in Harrogate) and the directors' fees (£110) he thought large when compared with the amount of profit made.

The CHAIRMAN said if any number of members wanted rubine in syphons they would only be too happy to supply them. But he reminded members that large quantities of that class of beverages were taken in champagne bottles, and he did not know of any sold in syphons. The stock of bottles, &c., was one of the great difficulties of the trade. In the summer they often had none left to fill. Their enemies, the railways, sometimes kept packages of empties waiting about for a fortnight. He did not consider the office expenses were at all high. They could not be compared with the profits. There might be no profits. Was the secretary not to be paid at all in such a case? The directors had £25 a year each, and he did not think they were overpaid. Mr. Wilson, at Harrogate, did work for them which they could not get done for £100 a year.

Mr. WILSON, Harrogate, gave some particulars of the Harrogate branch, which had been despised, but which he believed would compare well with the London concern. The business of the shareholders was largely increasing. He had taken 17 customers and compared their payments last year and this year. Last year they were £2418, this year £4227.

A MEMBER thought the profit ought all to be devoted towards paying off the preliminary expenses.

Mr. FITCH said the payment of a dividend would best ensure their future success by bringing them new members.

This view was generally supported, and the motion was carried.

Some further discussion ensued respecting the sale of rubine in syphons, and the chairman informed Mr. Nicholls that they would supply him or any member with the article in syphons at 4s. per dozen.

Messrs. Davenport and Goldfinch were re-elected directors, and votes of thanks were passed to the secretary and to the directors.

ARNOLD & SONS' PATENT "SIMPLEX" ENEMA.

NOTICE.—ARNOLD & SONS, at the suggestion of several leading members of the profession, have introduced a cheap form of their Patent "Simplex" Enema, which will be found to supersede all other Enemas.

It is acknowledged to be the most simple, durable, and effective instrument yet introduced.—Vide the *Lancet*, August 17th, 1872; *British Medical Journal*, June 22nd, 1872; *Medical Times and Gazette*, June 22nd, 1872; *Medical Press and Circular*, June 26th, 1872.

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Vide *Medical Press and Circular*, June 25th, 1879; *Medical Times and Gazette*, July 12th, 1879; the *Lancet*, May 24th, 1879.

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The great reputation gained by Tonga during the two years that it has been before the public sufficiently testifies to its intrinsic value, a value which is recognised by the medical profession, as evidenced by the habitual way in which it is prescribed by leading physicians both at home and abroad. The *Lancet*, after devoting three long papers to remarkable cases of Neuralgia cured by Tonga (see papers by Dr. Murrell, Dr. Ringer, Dr. Lush, and C. Bader, Esq., on March 6th and 20th, and May 29th, 1880), recently wrote: "Tonga maintains its reputation in the treatment of Neuralgia;" whilst the *Medical Press and Circular* speaks of Tonga as "Invaluable in Facial Neuralgia;" and adds, "It has proved effective in all those cases in which we have prescribed it." Tonga may be obtained from all Patent Medicine houses, and from the Sole Consignees and Manufacturers,

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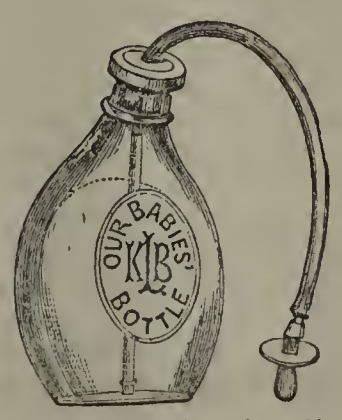

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT CAUTIONS

From Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

It was proved in Court, on affidavit by Mrs. Forbes, of Paris, that the testimonial published in the *Times*, November 14th, 1865, speaking of the great efficacy of Chlorodyne in Cholera referred to Dr. J. Collis Browne's Chlorodyne, and that she never used any other, that she had written to the Defendant Freeman to that effect, notwithstanding which notice the Defendant publishes the said testimonial as referring to his medicine.

The Editor of the *Medical Times*, in his report on Chlorodyne, January 13th, 1866, gives information that the Chlorodyne referred to was the medicine introduced by a retired Army Medical Officer, which was Dr J. Collis Browne, still this is published by the Defendant as testimony to his medicine.

Numerous affidavits from eminent Physicians and others were produced in Court, stating that Dr. J. Collis Browne was the inventor of Chlorodyne, and that when prescribing they mean no other.

The Defendant himself publishes that his compound is in effect and composition quite different to any other preparation, nevertheless he assumes the name, testimonials, &c., of Chlorodyne.

Technicalities in law prevent that protection which the public should justly have against such a course of conduct. It is now incumbent on all who purchase Chlorodyne to see that the name, "Dr. J. Collis Browne's Chlorodyne," is engraved on the Government Stamp, as it is not sold otherwise. All other compounds under the name of Chlorodyne are spurious. All attempts at analysis have failed, hence the statement that the constituents of Chlorodyne are known is a misrepresentation.

FURTHER IMPORTANT NOTICE.

From SYMES & CO., Pharmaceutical Chemists, Medical Hall, Simla.—*January* 5, 1880.

To J. T. DAVENPORT, Esq., 33, Great Russell Street, Bloomsbury, London.

DEAR SIR,—Have the goodness to furnish us with your best quotations for Dr. J. COLLIS BROWNE'S Chlorodyne, as, being large buyers, we would much prefer doing business with you direct than through the wholesale houses. We embrace this opportunity of congratulating you upon the wide-spread reputation this justly-esteemed medicine has earned for itself, not only in Hindostan, but all over the East. As a remedy of general utility we much question whether a better is imported into the country, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances, *ad infinitum*, of the extraordinary efficacy of Dr. COLLIS BROWNE'S Chlorodyne in Diarrhœa and Dysentery, Spasms, Cramp, Neuralgia, the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than COLLIS BROWNE'S, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than COLLIS BROWNE'S is a deliberate breach of faith on the part of the chemist, to prescriber and patient alike.

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SYMES & CO.,
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See also—*British Medical Journal*, Nov. 13th, 1880; *Medical Times & Gazette*, Jan. 1st, 1881; *Medical Press*, Jan. 26, 1881.

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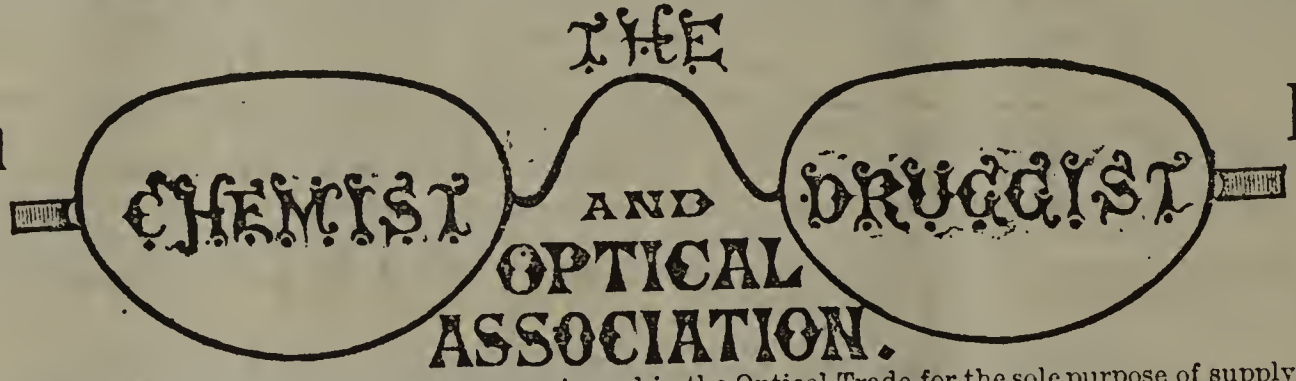

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QUALITY IS OF FIRST IMPORTANCE

THE CRYSTALLINE CONSTITUENT OF JAFFERABAD ALOES.*

BY W. A. SHENSTONE.

It will be remembered that at the Evening Meeting of the Society held in March, 1881, Mr. Holmes brought forward a specimen of aloes known in the Bombay market as Jafferabad aloes, which he had received from Dr. Dymock. Shortly afterwards I proposed to Mr. Holmes that an examination of its crystalline constituent would perhaps be interesting, and he very kindly obtained a supply of the drug for me, which I received during the first half of the present year.

I found in a preliminary examination of the substance that although the method employed for obtaining aloin from Barbados aloes was not without result when applied to the Jafferabad aloes, yet that a better result could be obtained by Histed's method.

Accordingly about 1½ pound of the powdered aloes was treated with enough proof spirit to make a thin paste, and after standing for a few hours was enveloped in folds of stout calico and submitted to powerful pressure, by which means I found that a yield of about 28 per cent. of crude aloin could be obtained.

This crude aloin was purified by twice crystallizing from water, then by crystallizing several times from dilute spirit and finally by crystallizing twice or thrice from rectified spirit. Portions of the crops of crystals thus obtained were burnt with the following results:—

I. ·1104 gram of aloin which had been once crystallized from rectified spirit and dried *in vacuo* over sulphuric acid gave ·2438 gram of CO_2 and ·0561 gram of H_2O.

II. ·1380 gram of aloin which had been twice crystallized from rectified spirit and dried *in vacuo* over sulphuric acid gave ·3042 gram of CO_2 and ·0696 gram of H_2O.

Corresponding to—

	Carbon.	Hydrogen.	Oxygen.
I. . . .	60·22	5·64	34·14
II. . . .	60·11	5·60	34·29

The aloin was therefore evidently in a pure state. 1·2375 gram of pure air-dried aloin dried over sulphuric acid in a vacuum lost ·1987 gram of water, corresponding to 16·0 per cent.

When bromine water was added in excess to an aqueous solution of the aloin a copious yellow precipitate fell. This was collected after having been in contact with excess of bromine water for an hour, washed, dried and crystallized three times from spirit. The brominated aloin was in beautiful yellow crystals, which were rather soluble in cold alcohol, and were somewhat more stable than the aloin itself. It retained only a trace of water when dried in a vacuum over sulphuric acid, which was given off on heating to 100° C. to 110° C. ·2526 gram of the perfectly dry substance gave ·2539 gram of silver bromide, corresponding to 42·75 per cent. of bromine.

In 1875 Dr. Tilden proposed, as the result of the consideration of a number of analyses of aloins and their derivatives made by himself and others, that the aloins obtained from Barbados and Zanzibar aloes might be considered isomeric bodies, with the empirical formula $C_{16}H_{18}O_7$, which also agrees closely with the results of his analyses of nataloin. This formula requires 59·62 per cent. of carbon and 5·59 per cent. of hydrogen. Its tribromo derivative requires 42·93 per cent. of bromine.

It will be seen that of the numbers obtained in my analyses those for the hydrogen and bromine agree very closely with these, and that the proportion of carbon, though a little high, also agrees fairly well.

The water of crystallization found, 16 per cent., is rather more than the amount which would correspond to three molecules, *i.e.*, 14·3 per cent. The difficulty of getting air-dried aloin of constant composition, however, is so great that the result is not of much value.

Dr. Tilden found that air-dried zanaloin when dried over sulphuric acid in a vacuum gave off about 14 per cent. of water.

In addition to the above work the following comparative observations were made; in making them some of my aloin from Jafferabad aloes and a portion of Dr. Tilden's zanaloin, which he kindly gave me for the purpose, were employed.

There is no distinguishable difference in the crystalline form of the two aloins.

No. 1*a*.

No. 1*b*.

No. 2.

In the above engravings, which are from photographs and, therefore, absolutely trustworthy,† 1*a* and 1*b* are of the aloin of Jafferabad aloes,‡ and 2 is of zanaloin of Dr. Tilden's preparation. Two photographs were taken of my aloin, as with the available slide it was not possible to get good pictures of both the large and small crystals at once.

Neither of them gives any change of colour in the cold when moistened with ordinary strong nitric acid; both of them are reddened by fuming nitric acid. And the Jafferabad aloin, by prolonged treat-

* Read at an Evening Meeting of the Pharmaceutical Society, December 6, 1882.

† These were kindly taken for me from microscopic slides by Mr. Woollet, of Colchester, who, with my brother, has lately taken a good deal of interest in such work.

‡ The magnification in each case is about 180 diameters.

ment with nitric acid, yields chrysammic, aloetic, picric, and oxalic acids, as zanaloin and barbaloin do.

Jafferabad aloin, when treated with potassium chlorate in a hydrochloric acid solution, yields a chloro-body resembling that given by zanaloin, and when heated with acetic anhydride gives an acetyl compound similar to acetyl-zanaloin.

Both of them, when treated with strong sulphuric acid and potassium bichromate, give a violet coloration closely resembling that given by strychnia, but quickly fading to *green*.

These results seem to leave no doubt that the aloin of Jafferabad aloes is identical with that from Zanzibar aloes, though I should state that the colour of the former is distinctly a lighter shade of yellow than that of the latter.

Up to the present time four aloins have been examined somewhat minutely, viz., those known as barbaloin, zanaloin, nataloin, and that which is the subject of the present communication. In addition socaloin has been partly examined and is believed to be identical with zanaloin.

As the adoption of a new name for every fresh variety of aloin examined is likely to be a source of some inconvenience, and as there is an obvious advantage in adopting a nomenclature which will group together those aloins which are most nearly alike, and also because the aloins seem likely to fall into a few groups, I venture, in concluding this paper, to make the following suggestion, which I think will make a comprehension of the sources and properties of these bodies a little more easy to attain than it is at present.

Since nataloin differs so distinctly from all the rest it will be convenient to retain that name for that substance.

And, since zanaloin, socaloin, and Jafferabad aloin differ so little from barbaloin, they may be conveniently classed together as "barbaloins," distinguishing the aloin of Barbados aloes, which was first discovered, and differs in a few particulars from the others as α-barbaloin, and the later discovered aloins, between which no distinct differences are known, as β-barbaloin. The main points of difference among these bodies could then be tabulated thus:—

1. Nataloin, obtained from Natal aloes, yields only picric and oxalic acids by treatment with nitric acid. Is not reddened, even on heating, by that reagent.

2. Barbaloins, yield chrysammic, aloetic, picric and oxalic acids by treatment with nitric acid.

They may be divided into—

a. α-barbaloin, obtained from Barbados aloes. Is reddened in the cold by ordinary strong nitric acid.

b. β-barbaloin, obtained from Socotrine, Zanzibar, and Jafferabad aloes. Is not coloured by cold nitric acid, but gives an orange red coloration when heated with it, and also gives a coloration in the cold with fuming nitric acid.

The point is not one of great importance, but I think this, or some similar system, might now be conveniently adopted, in place of giving a new name to each aloin even when it is in no way different from others already known.

Clifton College, 1882.

[*The discussion on this paper is printed at p.* 475.]

THE SALE BY PUBLIC AUCTION OF SPURIOUS AND WORTHLESS DRUGS.*

BY E. M. HOLMES,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

Since its incorporation in 1843, the Pharmaceutical Society of Great Britain has taken every opportunity of making as widely known as possible, through the columns of its Journal, all cases of spurious or worthless drugs that have been brought under its notice.

It is much to the credit of the retail trade, that in a large number of cases these falsifications have been detected and pointed out by its members. This statement naturally implies that in such cases the samples have passed undetected through the hands of the wholesale dealers. To assume that this is always the case, however, would be unjust to a considerable number who have, especially of late years, called attention to the very unsatisfactory state of the drug market, and who have on various occasions pointed out the occurrence of adulterations or of very inferior qualities of drugs.

The term "adulterated" is sometimes erroneously applied to crude drugs which do not consist wholly of the article of which they bear the name. Strictly speaking, only those drugs can be said to be adulterated in which there is evidence of some substance being added with fraudulent intention.

In many cases roots, etc., collected by peasants, have other kinds mixed with them, either through the ignorance of the collector, or through carelessness in collecting and drying; or the mixture may occur when the cases containing the drugs are opened at the custom house. I believe, in all wholesale houses of any reputation, these admixtures are removed during the processes of screening, fanning, or picking over, to which crude drugs are subjected before being distributed. The fact of these admixtures not being adulterations is obvious from their occurrence in very small percentage, and from their not bearing a close resemblance to the drug in which they occur.

There is another form of so-called adulteration of drugs of very common occurrence, which consists in the substitution of an unknown drug for the genuine article. This arises in the following way. A merchant abroad sends to the English market, on speculation, a drug which is used in his own country, and which he, in his ignorance of the drug trade, supposes will obtain a remunerative price in this country. The consignee being unable to sell the drug, in consequence of it being unknown, puts it up to auction. At the sales it appears under the name of the drug which it most nearly resembles. In some cases the resemblance is very striking, so that it is quite possible for even a practised eye to be deceived, and the substitution is only discovered when the drug is used in pharmacy. This is notably the case with calisaya bark, cusparia and pareira brava, so much so, indeed, that the description of the last-named drug in the British Pharmacopœia is obviously taken from a mixture of the false and genuine drug.

Those who are acquainted with the wholesale trade are aware of the extent to which different samples of the same drug may vary in size, colour and general appearance, *e.g.*, anise, fennel, cusparia

* Read at an Evening Meeting of the Pharmaceutical Society, December 6, 1882.

bark, liquorice root, aloes, etc., and how easy it is to believe that slight differences merely indicate that the drug comes from a new locality or has been grown in a different climate.

It is very creditable to the members of the wholesale trade that, notwithstanding these difficulties, the substitutions are, in most cases, detected by them before the drugs are sold.

There is, however, a great disadvantage attached to this custom of offering one drug under the name of another in the drug sales. The spurious drugs which often come over in large quantities are purchased at a low price, I believe, by continental dealers known as "mixers," and after being mixed with genuine drugs are sent back to this country with the view of underselling dealers in the legitimate article. Such admixtures are constantly cropping up either in this country or on the continent. This practice cannot fail to exert a baneful influence on the trade, since those who sell the best quality cannot compete with those who sell adulterated drugs.

It would obviously, therefore, be a gain if drugs unknown in this country were not permitted to be sold under the name of those they most resemble, but were obliged to be sold under their real name. To prevent altogether the sale of drugs for which some use might be found would be an act of injustice.

The term "adulterated drugs" may, I think, be limited to those in which there is evidence of an intent to defraud—

1st. By the addition of any substance of less value to increase the weight, such as the addition of sulphate of barium to cochineal and saffron.

2nd. By the admixture of cheaper drugs having a great similarity of appearance, *e.g.*, marshmallow with belladonna root.

3rd. By the addition of a colouring matter to enhance the value, *e.g.*, aniline dye to rose leaves.

4th. By the exhaustion of their active principles before being offered for sale as the genuine article.

Under these headings I wish to direct attention to a few cases of recent occurrence.

1. *Saffron.*—The sample of saffron which I have placed on the table was purchased in London and contains sulphate of barium. To the naked eye it presents the colour and appearance of a fine sample of saffron, but under a hand-lens some threads are seen to be coated with some kind of paste in which occur little holes formed by the bursting of bubbles of air. When stirred in water that liquid becomes immediately coloured and a white powder settles down to the bottom of the vessel. This powder, which is insoluble in nitric acid, having been examined in the laboratory by Mr. W. E. Crow, proved to be sulphate of barium.

2. *Senega.*—In the November number of the *Répertoire de Pharmacie,* M. Charbonnier mentions that in the town of Calvados a number of the pharmaciens have received, from Paris, senega adulterated with white ipecacuanha, *Ionidium Ipecacuanha.* As this root was offered in the London market a year or two ago and disappeared, it has apparently found its way to France and has been used for the purpose above stated. When an adulterated drug is made known in one country, it soon appears in another; hence it behoves the druggist in this country to be on his guard against this adulteration. The rough surface, woody fracture and absence of keel, sweet taste and bright yellow meditullium will serve to distinguish the root of *Ionidium* from senega.

Arnica.—The flowers of *Inula britannica,* which have already been described in the Journal of this Society, as a substitute for arnica, have now been offered in England, and a sample of them is placed upon the table.

3. *Rose Petals.*—Rose petals coloured with rose aniline are still to be met with in this country, although the fraudulent coloration was exposed by Mr. T. E. Greenish in March, 1881.

4. *Jalap.*—The specimen of exhausted jalap root, which has already been alluded to in the Journal as having been deprived of its resin in Paris and offered and sold in London, has been examined, and apparently contains no resin. It behoves the members of the trade, therefore, to examine their jalap powder as to the percentage of the resin it contains and as to the insolubility of the latter in ether or otherwise.

Having recently, while going through the Hanbury collection, observed a curious specimen of jalap, labelled "Peculiar form of Jalap, imported in 1861," 100 grains of it were boiled in alcohol and the tincture poured into water. As in a previous experiment with the specimen presented by Mr. Williams, no trace of resin was precipitated. The jalap had been cut longitudinally in the same way, and had a very similar appearance, except that it looked blacker externally. Internally, it was extremely tough and as difficult to cut as powder of squills when it has caked together, in which point alone it seemed to differ from Mr. Williams's specimen. The root was evidently that of true jalap exhausted of resin. It would appear, therefore, that the practice which is now made known is not new, but was carried on twenty-one years ago.

Ipecacuanha.—The sample of mouldy ipecacuanha mentioned in the *Pharmaceutical Journal* was found to give evidence of the presence of emetine, when the process described in 'Pharmacographia' was adopted. A sample which I received this month, as being undoubtedly the same article after having been washed and dried, when subjected to the same test seemed to contain less alkaloid. This root was much darker in appearance and had a cleaner surface than the ordinary drug. A sample is laid before the meeting for inspection.

It may be of some interest to call attention to the fact that the publication of cases of adulteration of drugs is not sufficient to act as a deterrent. It is true that in some cases, such as senna and pareira brava, the quality has much improved of late years, but these are exceptional cases, and senna mixed with argel leaves is still procurable. A few remarks concerning the adulteration of saffron with mineral matter will show that some more stringent method is required in order to stop the fraud.

Saffron.—In 1869, the *Répertoire de Pharmacie** described an adulterated saffron met with in commerce, which had a very rich colour and fine appearance, the colour having been heightened with about 5 per cent. of a fixed oil, while about 12 per cent. of mineral matter was found in it.

In August, 1870, M. Constantine, of Brest, called attention, in the *Union Pharmaceutique,*† to the adulteration of saffron with 15 per cent. of chalk, stating

* *Pharm. Journ.*, [2], xi., 231.
† *Pharm. Journ.*, [3], i., 266.

that it had been obtained from a drug house of good repute.

In September, 1870, Mr. D. Hanbury* gave an analysis of some samples of adulterated saffron, containing carbonate of lime to the extent of from 7 to 22 per cent. All the samples containing this adulteration were from Alicante. He remarked that saffron adulterated in this manner is for the most part *undistinguishable to the eye* from the drug in a state of purity.

At the same date Professor Maisch remarked, in the *American Journal of Pharmacy*, upon the occurrence of the same adulteration in the United States.

In February, 1871, Mr. J. Ingham† described a sample of saffron which he had "obtained from a drug firm in London, whose drugs are generally to be relied upon for purity as much as any other," and which had been purchased as *Crocus sativus, opt.*, at 56*s*. per lb., as containing 40 per cent. of the same impurity.

In 1874, J. Mueller,‡ of Breslau, stated that he found 9 per cent. of sulphate of barium in one sample of saffron, and 25 per cent. of carbonate of calcium in another.

In 1879, M. Boutet published in the *Journal de Pharmacie*, vii., p. 669,§ an account of the adulteration of saffron of a similar character, the substances added in this case being 25 per cent. of sulphate of lime and 20 per cent. of glucose.

In the same year Herr Johanson, of Dorpat (*Pharm. Zeit. für Russl.*, October 15), stated that he found a commercial specimen of saffron to contain 39 per cent. of calcium carbonate.

It thus appears that, notwithstanding the publication of the adulteration of saffron with mineral matter in the Journal of this Society and in various continental journals, saffron is still to be met with in commerce, adulterated in the same manner that it was thirteen years ago.

[*The discussion on this paper is printed at p.* 476.]

FURTHER OBSERVATIONS ON ARSENIC.‖

BY W. A. H. NAYLOR AND J. O. BRAITHWAITE.

At its last meeting the Society was honoured with a contribution from a distinguished French pharmacien, in which oxalic acid was recommended to be used as a test for arseniates in alkaline salts. It will be remembered that this note of M. Patrouillard was submitted as a rejoinder to an unfavourable criticism we had ventured to offer upon a previous communication which he had published in the *Bulletin No.* 1 *de la Société des Pharmaciens de l'Eure.*

In this paper we understood the author to express the opinion that oxalic acid exercised a reducing action upon arsenic acid. This view being contrary to that held by one of us, we conjointly investigated the subject, the result being that our experiments led us to adopt a conclusion the opposite to that at which he had arrived. A summary of our work on this inquiry was embodied in a paper read before the Conference at Southampton, in August last.

In his rejoinder, M. Patrouillard courteously reminds us that in every place in his memoir where mention is made of arsenic acid, "it is always understood that it is the acid combined with alkalies that is referred to, and that the idea never occurred to him to examine the action of oxalic acid upon uncombined arsenic acid; *à priori* he would have thought that it was the same as upon arseniates."

The point at issue then is clearly this:—Does oxalic acid, when boiled with a solution of arseniate of sodium, exercise a reducing action upon it, either *per se*, or through the intervention of sulphuric acid and sulphuretted hydrogen? To the settlement of this question the following experiments are directed:—

Experiment 1.—1·0 gram of disodic arseniate and ·50 gram of oxalic acid were dissolved in 50 c.c. of water, and boiled for half an hour. When cool the oxalic radical was removed by barium nitrate, filtered, the filtrate decomposed by sodium bicarbonate, and the solution divided into four portions. These were severally examined for arsenite after the manner described in our previous paper; the reagents applied being mercuric oxide, our modified Fehling, iodine and permanganate of potassium. In each case no evidence of a reduction was obtained.

Experiment 2.—This differed only from No. 1 in that oxalate of ammonium was substituted for the free acid. Here also no evidence of a reduction was traceable.

Experiment 3 was identical with No. 1, except that the arseniate was mixed with nine times its weight of sodium nitrate. Search for an arsenite was attended with negative results.

If to the sum of these experiments be added the further fact that a solution of arseniate and oxalic acid on prolonged boiling evolves no carbonic anhydride, we deem the evidence sufficient to warrant the assertion that oxalic acid *per se*, under the conditions now described, exercises no reducing action on disodic arseniate.

Experiment 4 consisted in passing sulphuretted hydrogen through a solution of disodic arseniate containing half its weight of oxalic acid, it having been previously boiled for half an hour. It was observed that no turbidity was produced in the liquid until a steady stream of gas had flowed through it for three minutes; at the end of five minutes little reddish-yellow pellets had formed, and in fifteen minutes a flocculent precipitate had appeared. For the purpose of comparison a second solution was prepared, to which was added sufficient arsenite of sodium so as to contain the equivalent of ·25 per cent. of arsenious oxide. On passing the gas through it a precipitate of tersulphide was produced in a *few seconds.*

Notwithstanding the strikingly convincing character of these experiments it was thought desirable to go a step farther, and to ascertain if the oxalic acid influenced to any extent the composition of the precipitated sulphide.

Experiment 5.—2·0 grams of disodic arseniate and ·5 gram of oxalic acid were dissolved in 50 c.c. of water, and the solution boiled for half an hour. When cool it was strongly acidified with sulphuric acid. Sulphuretted hydrogen was passed through the liquid until no more precipitate fell. The precipitate was collected, thoroughly washed, pressed between bibulous paper and dried in a current of

* *Pharm. Journ.*, [3], i., 241.
† *Pharm. Journ.*, [3], i., 624.
‡ *Archiv der Pharm.*, 1874, Bd. ii., p. 517.
§ *Pharm. Journ.*, [3], x., 422.
‖ Read at an Evening Meeting of the Pharmaceutical Society, December 6, 1882.

dry carbonic anhydride first at normal temperature, and subsequently at about 90° C. until the weight was constant. It was then digested repeatedly in carbon bisulphide and filtered. The united filtrates left on evaporation and drying a quantity of sulphur equal to 3·5 per cent. on the dry sulphide. A second experiment, conducted in precisely the same manner, omitting the oxalic acid, gave a quantity of sulphur equivalent to 3·8 per cent. on the dry sulphide. On the assumption that the sulphur resulted from the decomposition of the higher sulphide the two results would represent 13·45 per cent. and 14·60 per cent. of tersulphide of arsenic respectively. As this line of procedure held out no promise of obtaining a reduction which might legitimately be attributed to the oxalic acid, we determined to ascertain what action, if any, took place between the sulphuretted hydrogen and oxalic acid.

Experiment 6 consisted in passing sulphuretted hydrogen through a solution of oxalic acid. At the expiration of one hour, the liquid was filtered. The filtrate on examination was found to contain a small quantity of a substance which, on boiling, reduced silver nitrate solution. The experiment was repeated, but this time the gas was passed through a solution of the acid kept boiling, and the vapour was condensed. The resulting distillate gave proof of the existence of the reducing substance, and in much larger quantity. From the solubility of its barium, calcium and magnesium compounds, from the readiness with which on boiling it converts mercuric chloride in solution into calomel, and reduces silver nitrate to the metallic condition, there can be little doubt that the body in question is formic acid. Here it may be mentioned that Carle and others have detected it as a product of decomposition on passing hydrogen and nitrogen gases through oxalic acid. Parenthetically we may state that sulphuretted hydrogen obtained from native sulphide of antimony was alone used throughout our experiments. It now became a point of interest to know if formic acid would reduce alkaline arseniates. The test was applied by boiling a solution of disodic arseniate with a little of the acid. No carbonic acid gas was given off, and at the end of one hour there was no reduction. The solution was then evaporated on a water-bath to dryness; still it afforded no evidence of an arsenite.

And now having regard to the whole of our experiments, we conclude that oxalic acid *alone* exercises no reducing action, either on arsenic acid or on disodic arseniate. Further, that the oxalic acid cannot be credited *indirectly* with the reduction which results from the transmission of sulphuretted hydrogen through the solution of arseniate and oxalate previously boiled and acidified with sulphuric acid.

There now remains to us the pleasant duty of acceding to a request, expressed privately by M. Patrouillard, in which we are asked to make the following correction. That in the sentence "l'acide oxalique semble donc agir sur l'acide arsenique aussi bien lorsqu'il est combiné que lorsqu'il est à l'état libre," the words *combiné* and *l'état libre* refer to the oxalic and not to the arsenic acid as interpreted by one of us. The passage then should be so construed as to imply that the oxalic acid, whether free or combined, acts equally well on the arsenic acid.

[*The discussion on this paper is printed at p.* 478.]

MARGARINE MANUFACTURE IN SCOTLAND.*

There are few subjects on which so much popular delusion prevails as in connection with the manufacture of butterine. A large section of the community will purchase almost any kind of mixture so long as it is placed before them in an attractive manner, and labelled pure butter; while they shrink with a feeling almost akin to horror from the artificial substitute, no matter how superior it may be in quality, if it is presented to them under its proper name. The most preposterous stories are circulated about butterine being manufactured from the fat of all conceivable kinds of animals—stories whose only foundation is in the imagination of their originators.

There is only one substance from which butterine, or margarine as it is called in the earlier stage, can be manufactured—that is, pure fresh beef-suet and fat, or what is known in the trade as tallow. The latter name must not be confounded with that applied to the coarser article used in the manufacture of soap and candles. The tallow is principally purchased at auction sales held in Edinburgh, Glasgow, and Aberdeen towards the close of each month, conducted by limited companies. The catalogue contains the names of the principal butchers slaughtering in the local market, with an approximate estimate of the probable quantity each will produce during the month. Each butcher's lot is knocked down separately at a certain price per cwt., and charged at that rate. The tallow is paid for after delivery, generally at the close of each week. An ox will produce, on an average, about 56 lbs. of tallow, and a sheep about 7 lbs. or 8 lbs. The quantities sold for the present month were—at the Glasgow tallow sales, about 140 tons for the month, and the top price realized was 44*s.* 3*d.* per cwt.; Edinburgh Hide, Skin, and Tallow Market Company's sale, about 40 tons, with a top price of 44*s.* 9*d.*; and the Aberdeen Tallow Market Company, about 60 tons, with a top price of 48*s.* 9*d.* The principal manufacturers in Scotland are—Messrs. A. and J. Beveridge, Leith; Messrs. Thomas Dickson and Son, Edinburgh; Messrs. Alexander Ogston and Sons, and Mr. Alexander Lyon, Aberdeen.

The process of manufacture is conducted throughout with the most scrupulous attention to cleanliness, and great care is taken that no stale pieces of tallow are introduced into the margarine, as they at once make their presence known, and taint the article both in taste and smell. When the animals are slaughtered the tallow is hung up in well-ventilated apartments at the slaughter-house for a night, in order to clear off the animal heat and the moisture. Next morning it is taken to the premises of the manufacturer, and spread out upon tables, where all extraneous substances and dirty and stale pieces are carefully cut off the tallow. The selected tallow is then hung up for another night in cool apartments, after which it is cut into small pieces by hand or machinery, and passed through a crushing machine, whence it falls into a large vat. This vat is placed within another vat, and into the intervening space steam is introduced at a gentle temperature. The fat, to which a small quantity of acid has been added to aid in its refinement, is repeatedly stirred, until it has all been exposed to the action of the heat and melted. It is then allowed to settle, after which the oil is drawn off into iron pans, each holding several hundredweights, where it remains for several days, until it has attained a pasty consistency. At this stage the fat still contains its natural quantity of stearine, and is technically known as *premier jus*, or first juice. The fat, having been taken from the pans, is folded up in clean linen cloths and placed in a hydraulic press, in alternate tiers, between iron plates, where it is gradually subjected to enormous pressure. The oil, or oleo-margarine, thus extracted, is drawn off

* From the *Grocer*, Nov. 25, 1882.

into settling pans, where it remains over-night, after which it is placed in casks usually containing about 3 cwts. each. It is then ready for export.

The substance remaining in the cloths is known as "pressed tallow," and after undergoing further pressure and a process of distillation it yields glycerine and stearine. The latter substance is used for the manufacture of a very fine description of candle, which if properly made is able to resist even the heat of tropical climates. Although the greater part of the tallow purchased at the auction sales is that of oxen, and of a character suited to the manufacture of margarine, yet there is always a considerable proportion of refuse and sheep-tallow. The latter contains a much larger proportion of stearine than ox-tallow, and is therefore unsuitable for the manufacture of margarine. It is, however, used along with marrow and the parings from the fat of roasts, in the manufacture of cooking or, as it known in the trade, marrow-fat. It is melted in a large pan placed over a fire, and in consequence the flavour is more agreeable for the purposes for which the fat is used than if it were melted by steam. The oil is strained off, and the remaining crackling, after having been subjected to hydraulic pressure, is made into "greaves," which form admirable food for animals, and are usually sold at about 14*s.* per cwt. Marrow-fat is sold in 1½-cwt. casks, firkins, and half-firkins, at about 50*s.* per cwt., in 56-lb. tins at 51*s.* per cwt, and in 28-lb. tins at 51*s.* 6*d.* per cwt. Oleo-margarine is at present worth about 70*s.* per cwt., and *premier jus* about 10*s.* per cwt. less. The price of both articles is extremely fluctuating, and occasionally falls considerably below the above figure, as two years ago, when oleo-margarine sold at much less than the cost of the raw material. Inferior and refuse tallow received from the slaughter-house, after having been melted in vats by steam, is made into tallow for soap making, and for the composition of "inspector's grease" for the axle-bearings of railway waggons. At present it is worth about 43*s.* 6*d.* per cwt. It is also made up into bars for "cup tallow" for the bearings of steam-engines.

Such is the process of manufacturing margarine generally followed out in Scotland. The manufactured article is exported principally to London, Holland and Belgium. Coming into the butterine manufacturer's hands, the margarine is churned up with sour milk, coloured with annatto, and placed in a tub of pounded ice, where it solidifies. It is then made up in ½-lb., 1-lb. and 2-lb. rolls, covered with muslin, and placed in boxes, or placed solid into tubs or firkins containing from 28 lbs. to 56 lbs. each. The latter class of packages are the more popular in this district. It is extensively sold in Glasgow, and to a considerably less extent in Edinburgh, and appears to give general satisfaction to those who use it. The market price at present ranges from 68*s.* to 92*s.*, and the article is retailed at from 10*d.* to 1*s.* 2*d.* per lb. On the whole, it is as nutritious as the genuine article, but rather deficient in flavour and smell—defects which will no doubt in course of time be remedied. It is, however, to be regretted that shopkeepers do not see their way to offer it to the public under its proper name, a proceeding which would be not only more honest, but which would ultimately tend to the more general adoption of butterine as an article of daily consumption. It is only public prejudice that can hinder its adoption; and this is being rapidly overcome, as is evidenced by the steadily increasing demand, wholesale houses all over the country being forced into selling the article by the demands of their customers. Practically there is little difference between it and fine butter. The one is made from the fat in the cow's milk, the other from the fat on the cow's back, and the chemical constituents are similar.

A NEW AND EXPEDITIOUS METHOD FOR THE DETERMINATION OF THE NITRITES, UNDER DIFFERENT CIRCUMSTANCES.*

BY EDMUND W. DAVY, A.M., M.D., M.R.I.A.,

Professor of Forensic Medicine, Royal College of Surgeons, Ireland, etc.

As the existence of nitrites and nitrates in different natural waters has been regarded (under certain circumstances) as affording evidence of previous sewage contamination, the determination of the presence or absence of such compounds, and their quantitative estimation when present, in the waters employed for domestic purposes, may be a matter of much importance in a hygienic point of view; and though we have some delicate tests for the detection in such of the presence both of nitrites and nitrates, as well as different methods for their conjoint quantitative determination, there is no very simple or expeditious method for the separate estimation of nitrites in waters, which may sometimes be required, if we except that not long since proposed by P. Griess, which method I shall presently describe, and compare with the one I have myself devised, and which I shall now lay before the Academy.

In making lately some experiments on certain nitrites, I observed a reaction, which, as far as I am aware, has not hitherto been described; and this being one of extreme delicacy, I have founded on it a new method not only for the detection of the presence, but likewise for the quantitative determination of the nitrites under different circumstances, but especially in the case of natural waters, for which it is peculiarly suitable. The reaction referred to is that of nitrous acid, or of a soluble nitrite, on the well-known substance, gallic acid; thus when an aqueous solution of that latter acid is brought in contact with a soluble nitrite, the mixture, unless the amount of the latter present be very small, will soon acquire a yellow or yellowish-brown tint, which will increase in depth up to a certain point, after which the colour remains permanent, whilst, at the same time, minute globules of gas make their appearance in the mixture. If, however, the quantity of nitrate present be exceedingly small, it will require several hours, or even some days, to complete the reaction at the ordinary temperature. By the application, however, of heat,† and bringing the mixture to the boiling point, even in the case of the most dilute solutions, the reaction will be completed in a few moments. This development of colour under the circumstances stated is evidently due to the oxidation of the gallic acid, at the expense of the nitrous acid, whereby the compound known under the name of tanno-melanic acid seems to be formed, whilst nitric oxide and carbonic acid gases are evolved. The following equation represents the changes which occur in the reaction:—

Gallic acid.	Nitrous acid.	Tanno-melanic acid.	Carbonic acid.	Nitric oxide.	Water.

$$C_7H_6O_5 + 2HNO_2 = C_6H_4O_3 + CO_2 + 2NO + 2H_2O.$$

These changes, with the development of colour, take place in neutral as well as in acid solutions, but more readily in the latter, and when they are heated, than at the ordinary temperature, as already observed. The colouring principle which is so produced seems to be the same substance that is formed by the gradual oxidation of gallic acid in aqueous solution by exposure to the air; or when this takes place more rapidly, by the solution being rendered alkaline by the addition of one of the alkalies before exposing it to its influence. The colouring matter so formed is unaffected by diluted acids—at least diluted sulphuric, nitric, and hydrochloric

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* A paper read before the Royal Irish Academy, April 24, 1882. Reprinted from the 'Proceedings,' [2], vol iii. (Science), No. 9, December, 1882.

† The continual application of heat has the effect of slightly diminishing the depth of colour developed in this reaction.

acids had no apparent effect on it; and the organic acids, acetic, oxalic, and tartaric, even in a concentrated condition, did not seem to produce any change. It is also very permanent, and does not appear to be affected by exposure to air and light, even after being a long time subjected to their influence.

The depth or intensity of the colour produced being in direct proportion to the amount of nitrite reacting on the gallic acid, a ready means is afforded for the quantitative determination of the nitrites. Thus, if a standard solution be prepared, containing a known quantity of nitrite, and if a given amount of water or solution under examination yielded with gallic acid a certain shade or depth of colour, and if the same bulk of the standard solution, or of a mixture of it with distilled water in known proportion, developed the same tint, the former would be considered to contain the same amount of nitrite as the latter, and by thus comparing the tints produced by the waters under examination with those caused by solutions containing known quantities of nitrite, the quantitative estimation of such may be quickly accomplished, just as in Nessler's process (now so much employed by chemists) the determination of ammonia is so readily effected. Indeed, the colour which is developed by the action of the nitrites on gallic acid most closely resembles that produced by ammonia on Nessler's reagent. The process, too, is conducted pretty much in the same way, except that we have a standard solution of an alkaline nitrite, instead of one of ammonia; and the test reagent is one containing gallic acid, instead of Nessler's solution; and finally, that the water or mixture, after the addition of the gallic acid solution, and a few drops of either sulphuric or hydrochloric acid, is heated to boiling in a test-tube and allowed to cool; after which it is placed in a cylindrical flat bottomed glass, to compare more accurately the degree of colour produced by the water under examination with that containing some known quantity of nitrite.

The gallic acid solution which I have employed for the determination of nitrites is a strong or saturated aqueous one, which, if not colourless, can be easily made so by boiling it for a few minutes with animal charcoal, filtering the mixture whilst still warm, and then adding immediately to the filtrate sufficient sulphuric or hydrochloric acid to render it strongly acid, which addition I have found prevents, to a great extent, the tendency of aqueous solutions of gallic acid to become of a yellow or brownish tint on keeping, which well-known property is due, as already observed, to the tendency of that acid to oxidize under such circumstances; but by the addition of the acids stated, I have kept solutions of gallic acid, which were even exposed to the air in open vessels, for over two months without undergoing any change in colour.

As to the standard alkaline nitrite solution, it may be readily prepared by decomposing a hot aqueous solution of silver nitrite with potassium or sodium chloride, and after the subsidence of the silver chloride formed, diluting the solution to the required amount. The one I employed was made, as Dr. Frankland directs, in his 'Water Analysis,' for the preparation of the standard alkaline nitrite solution to be employed in Griess's method for the determination of nitrites, which is prepared as follows:—0·406 gram of pure silver nitrite is dissolved in boiling distilled water, and pure potassium or sodium chloride added, till no more silver chloride is precipitated. The solution is made up to 1 litre, and the silver chloride being allowed to settle, 100 c.c. of the clear solution is made up to 1 litre, of which 1 c.c. is equivalent, as he says, to 0·01 milligram of nitrous anhydride (N_2O_3); and he further adds, that this solution should be kept in closely-stoppered bottles, quite full. A solution at least double this strength will, however, be found more convenient for my test. I may also observe that I have likewise used a standard solution made by taking the commercial potassium nitrite and boiling it along with alcohol, which will dissolve out the potassium nitrite, leaving undissolved the nitrate and other impurities; and this alcoholic solution, on evaporation and drying the residue, will furnish the nitrite suitable for this purpose.

In using this test a convenient quantity of water to employ is 25 c.c., which can be easily heated in a test tube of somewhat larger capacity, along with 1 or 2 c.c. of the gallic solution, and a few drops of sulphuric or hydrochloric acid, and, when the mixture has cooled, transferring it to a flat-bottomed cylindrical glass, where the depth of colour can be more readily determined and compared with that yielded by equal bulks of different mixtures of the standard solution with distilled water. But where the amount of nitrite is very minute, it will perhaps be better to use at least 50 c.c. of the water under examination. I should observe that the nitrates do not produce the reaction described with gallic acid, and, unless they are present in large quantity, do not affect the test; and that it (the reaction with the nitrites) appears to be uninfluenced by the presence of the different saline and earthy salts that occur in natural waters, as well as by the organic matters that may be there occasionally. It might be naturally supposed that soluble salts of iron (which are sometimes present to some extent in certain waters), producing as they do the well-known black or ink-like reaction with gallic acid, would preclude its employment as a means of estimating nitrites, where the former salts were present; but this is not the case; for the iron may be separated by the addition of ammonia and filtration, after which I have found that the filtrate, having been acidified, may be treated with gallic acid, for the estimation of nitrites. It appears, therefore, that none of the substances which would be likely to occur in natural waters interfere with the employment of this test.

As to what may be the exact limits of its indications, I have not yet been able to determine; but I have readily detected, by its use, an amount of nitrite in water equivalent to 1 part of nitrous acid in about 20,000,000 parts of water.

I have made a number of comparative experiments with this test of mine and those hitherto proposed for nitrites, but chiefly with that of P. Griess, already referred to, as Dr. Frankland (who is one of the first chemists of the day) has stated, in his 'Water Analysis,' that it is the only trustworthy means we have for the estimation of nitrites.

This test, I may briefly say, depends on the reaction of nitrous acid on metaphenylene diamine, or meta-diamidobenzol, a derivative of benzol, whereby an orange-coloured compound is produced, by the oxidation of this complex basic substance. This reaction is one of extreme delicacy, and the test is carried out pretty much in the same manner as the well-known Nessler's method for the determination of ammonia; or of mine, just described, for that of nitrites; the depth of colour produced by the test solution, with the water under examination, being compared with that of one containing a known quantity of nitrite; the details, however, of the method will be found fully stated in Dr. Frankland's 'Water Analysis.'

From several comparative experiments I have made with Griess's method and that of my own, I have come to the conclusion that the latter is almost, if not quite, as delicate a test for the nitrites as the former. I have, however, observed this difference between them, that when the proportion of nitrites present was considerable, that then Griess's test gave a more decided reaction, or that the colour produced was of greater intensity than in the case of the gallic acid test; but that when the amount of nitrite was exceedingly minute, that then there was but little or no difference in the delicacy of their indications. In some other respects, however, the test which I have proposed, possesses advantages over that of Griess; thus the metaphenylene diamine is at present a compound very difficult to be procured; so

much so that though I applied twice, lately, to one of the best-known firms in London for the manufacture of chemicals, they were unable to procure me a little of that substance; and that which I operated on was kindly given to me by my friend Dr. Tichborne, who procured it direct from Berlin. On the other hand, the reagent used in my test may be got for a few pence at any druggist's shop. Again, Griess's test solution will not keep, as it quickly acquires the same coloration that is produced by the reaction of nitrous acid or a nitrite on it, even when it is kept in closely-stoppered bottles, and therefore requires to be freshly made and titrated almost every time it is employed; whereas the gallic acid solution which I have recommended will, I find, keep for a very considerable time without apparently undergoing any alteration requiring its fresh titration, which is an important advantage. In conclusion, I may add, that whatever may be the comparative merits of the two tests contrasted, I have but little doubt that the one I have proposed will be found to be a useful and expeditious method for both the qualitative and quantitative determination of the nitrites under different circumstances.

SYRUP OF LACTUCARIUM.*

BY FRED. HOHENTHAL.

The chief difficulty in obtaining a syrup of lactucarium of good appearance is the resinous matter present in the lactucarium. In the U.S. Pharmacopœia process this substance is extracted along with the other constituents, but on the evaporation of the alcohol it separates almost wholly, and that with the small part remaining in solution gives the syrup mixed with it an unsightly appearance, although the finished product possesses the virtues of the drug in the fullest degree. There have been remedies proposed for this unsightliness, chief among which are those looking towards a total removal of this obnoxious resinous matter, which, it is claimed, has no medicinal effect, and many methods have been devised to remedy this evil. It was proposed, among others, to extract this resinous matter (caoutchouc) by means of petroleum benzine, and then make the remainder of the drug into syrup. In my experience, thus far, I have found this way to be the best I have yet operated with, although excellent results have been obtained by other processes, prominent among which is that recommended by Professor Balfour, of rubbing the evaporated percolate of lactucarium with carbonate of magnesia and water, filtering, and adding the requisite quantity of sugar, as in the process for syrup of tolu. This is an excellent method, and is used in many laboratories, but is objectionable, inasmuch as alkalies destroy some of the bitter principles of lactucarium.

In the process recommended for the new U.S. Pharmacopœia, a fluid extract is made by depriving the lactucarium of its resinous matter by means of benzine, and extracting the residue with diluted alcohol, and evaporating the percolate to the proper strength, so that 1 minim represents 1 grain of the drug. The extract is then mixed with the proper quantity of syrup, and gives an effective syrup of lactucarium of good appearance.

But the long continued heat necessary to evaporate the percolate down to the proper bulk required for a fluid extract is objected to by many, and I have, therefore, devised a formula intended to do away with as much of the heat as possible, as follows:—

Macerate 1 ounce of lactucarium with 3 or 4 ounces of benzine for twenty-four hours, decant the benzine solution, dry the residue, mix it with an equal bulk of clean dry sand, and exhaust with diluted alcohol to 8 fluid ounces; evaporate this tincture to 6 fluid ounces (instead of to 1 fluid ounce as in the other process), add water enough to regain the measure of 8 fluid ounces, then add sugar 12 troy ounces, and afterwards again water, or preferably glycerine enough to bring the measure to one pint.

By evaporating the percolate from 8 to 6 ounces, and adding water to regain the measure, we do away with so much alcohol, which is often objectionable, and is easily dissipated at a very gentle heat, whereas in the fluid extract method a higher and longer continued heat is necessary to drive off the water. I believe my formula will be found as desirable as any heretofore offered.

* From the 'Eleventh Annual Report of the Alumni Association of the College of Pharmacy of the City of New York,' 1882.

PHOSPHORUS PILLS.*

BY ALONZO ROBBINS.

What is the best formula for extemporaneously preparing phosphorus pills?

In reply to this query, the following formula is presented, and, although I cannot assert it is the "best" formula, it is certainly the most satisfactory that I have ever used:—

Take of	Phosphorus	1 grain.
	Chloroform	1 fluid drachm.
	Balsam of Tolu	30 grains.
	Wheat Flour	70 „

Rub the tolu with the flour until it is reduced to a fine powder; put the chloroform into a test tube, add the phosphorus and warm the tube until it is dissolved, pour the solution on the contents of the mortar, rub until a pilular mass is obtained, which divide into one hundred pills.

I found it convenient to have a solution of 6 grains of phosphorus in a fluid ounce of chloroform, of which solution 80 minims would be required in the above formula, each 100th of a grain of phosphorus; for one hundred pills each to contain the 60th of a grain, 134 minims of the solution would be required; and so on for any strength or number of pills.

No powder of any kind is needed in rolling out and dividing the mass. When finished, the pills may be moistened with a strong solution of tolu in ether, and immediately thrown into powdered liquorice root, or other suitable powder, rotated for a few moments, and the excess of powder removed, when they will be ready for delivery. But the additional time and labour required is so small, and the appearance of the product so much more creditable to the skill of the pharmacist, that it is strongly recommended that the pills be gelatin coated, and for this process either of the following formulas answer very well.

The first is a modification of a formula published in the *American Journal of Pharmacy*, 1879, p. 435. It possesses the advantage of being always ready; but the coated pills are rather slow in drying. The second requires to be heated when used, and needs the occasional addition of water; but when a considerable number of pills are to be coated, it is much to be preferred to the other, as the pills can be removed from the needles in a few minutes, and another lot put on and coated.

No. 1:—

Take of	Gelatin	℥j.
	Acetic Acid	f ʒxx.
	Spirit of Nitrous Ether	f ʒxii.
	Oil of Gaultheria	♏x.

Dissolve the gelatin in the acetic acid with the aid of a water-bath, then add the other ingredients, and mix. To be used cold.

No. 2:—

Take of	Gelatin	℥j.
	Sugar	ʒss.
	Water	f ℥ij.

Dissolve with the aid of a water-bath, and use while hot, adding a little water occasionally to make up for the loss by evaporation.

* From the 'Proceedings of the Pennsylvania Pharmaceutical Association,' 1882.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 9, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF SPURIOUS AND WORTHLESS DRUGS.

THE report of the discussion which, at the Evening Meeting last Wednesday, followed Mr. HOLMES'S communication on the sale by public auction of spurious and worthless drugs, will be read with interest, and cannot fail to assist the Committee specially charged with the consideration of the subject in drawing up its report. We think it will be recognized that the general tone of the discussion was eminently satisfactory, and that the position taken up by the different speakers was one strictly consistent with the claim of pharmacists to recognition from the public as a body of men who have been specially educated and trained to enable them to deal intelligently in drugs. It will be seen that, in compliance with a suggestion made by the PRESIDENT at the commencement of the discussion, the purely trade aspect of the question was kept in subjection, and the speakers chose for topics rather their experience as to the occurrence of adulterated, inferior and substituted drugs in this country, and the best method of preventing their introduction into the pharmacy.

Mr. HOLMES, in his paper, very properly drew a distinction between cases where a partial or entire substitution of one substance for another is the result of ignorance or mistake and others where there is evidence of sophistication with intent to defraud; but with respect to both these classes he appeared to suggest that there should be some kind of legislative interference on behalf of the retail dealer. He said he considered it would be a gain if drugs unknown in this country were prohibited from being sold, as they sometimes now are, under the name of those they most resemble, on the ground that these spurious drugs are purchased at a low price by continental dealers known as "mixers," by whom they are used for deliberate adulteration of the genuine drug. With respect to drugs adulterated with intent to defraud, Mr. HOLMES called attention to the fact that exposure by publication has not in the past had a sufficiently deterrent effect to make them disappear, and he quoted several recorded sophistications of saffron especially as showing that some more stringent method is required in order to stop the fraud.

It may be said at once, that if this be a correct interpretation of the views of the writer of the paper, they found no support whatever in the discussion. Mr. SCHACHT thought that if exposure were not a complete remedy it was the first step in the only process which commended itself to his mind for the solution of the difficulty. Mr. GREENISH recommended pharmacists to take care of themselves in respect to the drugs which entered their establishments. The VICE-PRESIDENT pointed out that one of the fundamental principles of the Pharmaceutical Society is the condemnation and extermination of drug adulteration, and said that this could be best accomplished as the result of a perfected education, and the dispersion throughout the country of a trained body of pharmacists who would not only decline to receive a spurious article, but would make it unprofitable to a dealer to offer one. Mr. UMNEY justly remarked that already wholesale druggists carry on their business under considerable responsibilities, since retailers have their remedy against them under the Sale of Food and Drugs Act if they supply any article that is not of the nature, substance and quality demanded by the purchaser. Mr. UMNEY claimed that members of the wholesale trade generally are anxious to prevent adulteration, and Professor BENTLEY testified to the skill and care which they exercise to attain this object. In fact, there appeared to be a general agreement that the best means of overcoming the difficulty are to be found in the will and ability of both wholesale and retail dealers to detect and expose substitutions or admixtures of drugs, whether effected intentionally or as the result of ignorance, and that there is nothing to indicate that either class is incompetent or adverse to the task. Even if it were not so, it is not quite evident why the sale of a drug under one name rather than another should have a reformatory effect upon a "mixer," who buys it knowing it is not what it is called and with a deliberate intention of using it for a dishonest purpose.

The time and care that have been devoted to the consideration of the subject will not, however, have been wasted. Every now and then more or less justifiable sensational statements are made with respect to the adulteration of drugs, and these are revivified time after time by every reporter on adulteration in want of material, until the features of each case become quite familiar. Although, therefore, those conversant with the subject know that few of these alleged sophistications would escape the notice of the skilled pharmacist, it will be well that it should go forth that the Pharmaceutical Society is watchful in this respect also of the interests of the public. On this account it appears worth considering whether the Committee which is now engaged upon the subject might not be made a permanent one, to which information respecting substitutions and adulterations might be communicated with a view to their exposure.

IMPORTS OF CHEMICALS INTO JAPAN.

A REPORT by Mr. Consul ENSLIE on the trade of the port of Kanagawa during the year 1881 gives fuller particulars than usual respecting the importation of drugs, chemicals, pharmaceutical preparations and dyes into Japan. So much has this trade developed during recent years that whereas twelve years ago it was carried on by a single firm, during the last three years nearly every mercantile house in Japan has more or less dabbled in it. The result has been that notwithstanding a much increased demand, following upon the successful efforts of the Japanese Government to introduce Western medical and other sciences into the country, the market has been somewhat over-supplied. The trade in chemicals for medicinal purposes is, however, described as having recently undergone considerable modification in consequence of the encouragement given to attempts at home manufacture, so that whereas in former years these goods were imported ready made and put up in convenient packages ready for dispensing, the Japanese are now in a position to prepare many of them themselves. The trade in pharmaceutical extracts, tinctures, scale preparations, etc., has in fact come to an end, only the raw materials being now required, and these are imported in bulk, in many cases direct from the producing countries instead of, as formerly, from England. In addition, German manufacturers are said to enjoy an increasing share of the remaining trade in chemicals used in medicine. Santonin, for instance, one of the most important imports of this kind, amounting to from 120,000 to 180,000 ounces annually, is derived almost entirely from that country. The consumption of quinine is not so large as might be expected, it being replaced by the cheaper cinchona alkaloids, but the principal supply is from Milan. The consumption of morphia has largely increased, and in this case the superiority of the English manufactured article has gained for it almost a monopoly of the market. A large quantity of potassium iodide is used, chiefly of English and French make, whilst potassium bromide is one of the few chemicals principally imported from the United States to the extent of about 25,000 lbs. annually. Tartaric acid, alcohol, bismuth and chloroform are also in steady demand. But the trade in alkalies and heavy chemicals used for manufacturing purposes is far more important than that in medicinal chemicals, and of this English manufacturers have at present the entire control. German manufacturers, on the other hand, monopolize the trade in dyeing materials, one of the principal in demand being aniline violet, which is used in conjunction with logwood for dyeing silk. The Japanese appear, as a rule, to show a preference for goods of English manufacture, but it is evident, from Mr. ENSLIE's report, that in the East, as at home, our countrymen find the Germans to be keen competitors.

PROPOSED INTERNATIONAL PHARMACEUTICAL EXHIBITION IN VIENNA.

A MEETING of representative pharmacists, convoked by the Austrian Pharmaceutical Society, was recently held in Vienna, for the purpose of considering whether it was practicable to have an international pharmaceutical exhibition in that city in the course of next year. The meeting appears to have been well attended, not only by members of pharmaceutical associations having their head quarters in Vienna, but also by representatives from associations in Styria, Austrian Silesia and other provinces. After discussion, an affirmative decision was arrived at, and it was resolved to organize such an exhibition, to be kept open throughout the month of August next. The rooms of the Vienna Horticultural Society are to be rented for the purpose, and a wish was expressed that the principal pharmaceutical bodies in Vienna (the General Austrian Pharmaceutical Association, the Austrian Pharmaceutical Society and the Vienna Pharmacists' Chief Centre) should each select five of its members to act together as an executive committee. The subject came under the consideration of the General Austrian Pharmaceutical Association at its last meeting, when it was decided to support the project and to subscribe one hundred florins towards the expenses. A similar amount had been previously subscribed by the two other bodies mentioned.

COLLEGE OF PRECEPTORS' EXAMINATIONS.

A SHORT time ago we referred to some of the statistics in the official Report on the Oxford and Cambridge Local Examinations. Further evidence of the growing tendency to submit the outcome of middle class education to the judgment of an independent and impartial body is found in the fact that the entries of candidates for the half-yearly examinations conducted under the superintendence of the College of Preceptors, which began on Tuesday last and have been carried on simultaneously in fifty-five local centres, exceeded eight thousand three hundred, making, with those examined at midsummer, a total of nearly thirteen thousand for the present year. We are informed that a supplementary examination for the preliminary literary subjects required by various bodies by whom the certificates of the College are recognized, among which is the Pharmaceutical Society, will be held in March next in London and at four provincial centres,—University College, Liverpool; the Leeds Medical School; Queen's College, Birmingham; and University College, Bristol.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of this Association will be held on Thursday, December 14, when a paper will be read on "Original Investigation in Pharmacy," by Mr. E. M. HOLMES, F.L.S. The chair will be taken at 8 p.m., by the President, Professor ATTFIELD, F.R.S.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 6, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. SAMUEL RALPH ATKINS, VICE-PRESIDENT.

Present—Messrs. Andrews, Borland, Bottle, Butt, Churchill, Gostling, Greenish, Hampson, W. Hills, Radley, Richardson, Robbins, Savage, Schacht, Symes Williams, Woolley and Young.

The minutes of the previous meeting were read and confirmed.

The Late Mr. Allchin.

The President read a letter from Mrs. Allchin, thanking the Council for the resolution of sympathy passed at the last meeting.

Appointment of Examiners for 1883.

The Council went into committee to consider nominations, and upon resuming the following pharmaceutical chemists were appointed to act as Examiners for the ensuing year, subject to the approval of the Privy Council:—

England and Wales.

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Benger, Frederick Baden, 7, Exchange Street, Manchester.
Brady, Henry Bowman, Hillfield, Gateshead-on-Tyne.
Corder, Octavius, 31, London Street, Norwich.
Ekin, Charles, 2, Lampton Road, Hounslow.
Fletcher, John, Montpellier Avenue, Cheltenham.
Gale, Samuel, 225, Oxford Street, W.
Greenish, Thomas Edward, 20, New Street, Dorset Square, N.W.
Linford, John Samuel, 5, Gladstone Street, Anlaby Road, Hull.
Plowman, Sidney, 2, Residence, St. Thomas's Hospital, S.E.
Southall, William, 17, Bull Street, Birmingham.
Tanner, Alfred Edward, High Cross, Tottenham.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.
Thresh, John Clough, 11, Eagle Parade, Buxton.

Scotland.

Ainslie, William, 58, George Street, Edinburgh.
Baildon, Henry Bellyse, 73, Princes Street, Edinburgh.
Clark, William Inglis, 26, South Back Canongate, Edinburgh.
Gibson, Adam, Leven.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John Bertram, 48, North Frederick Street, Edinburgh.

It was resolved—

"That the Board of Examiners for England and Wales shall meet in the months of February, April, June, July, October and December in 1883."

The cordial thanks of the Council were unanimously voted to the Boards of Examiners for their services during the present year.

Elections.

ASSOCIATE.

The following, having passed the Minor examination, and paid, as an Apprentice or Student, his subscription for the current year, was elected an "Associate" of the Society:—

Norman, William Francis.....Towcester.

A former Apprentice or Student was restored to his former status in the Society upon payment of the current year's subscription and a fine.

The name of the following person, who had made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

James Gater, 22, Victoria Road, Peckham, London, S.E.

Mr. John Munday was appointed Local Secretary and Superintendent of Written Examinations at Cardiff, in place of Mr. A. B. Hollway, who has resigned in consequence of ill health.

Additions to the Register.

The Registrar reported that—

George Gibbons, Adwy, near Wrexham,
James George Hole, Westbury, Wilts,

having severally made the statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted, and various accounts were ordered to be paid.

BENEVOLENT FUND.

Legacies.

Previous to the reading of the report of this Committee,

The Secretary read a letter he had received from the executors of the late Mr. Charles James Pearson, of Swansea, stating that that gentleman had bequeathed £100 free of legacy duty to the Benevolent Fund.

He reported also that he had received a cheque for £100 from the executors of the late Mr. Howden, in payment of the legacy previously referred to.

Donation from the Committee for Reception of the British Pharmaceutical Conference at Southampton.

The Secretary further reported that Mr. Chipperfield, Hon. Treasurer to the Local Committee of the British Pharmaceutical Conference at Southampton, had written that there had been a surplus of receipts over expenditure in connection with the recent meeting, and, in accordance with a resolution of the Local Committee, he had forwarded a cheque for £55 16*s.* 7*d.*, the amount of the balance, as a donation to the Benevolent Fund.

The thanks of the Council were voted to the Local Committee for their donation.

The report of the Committee included a recommendation of the following grants:—

£15 to a former Member who was also a subscriber to the Fund.

£5 to a pharmaceutical chemist, who has been unfortunate and suffered from illness.

£5 to the widow of a registered chemist and druggist.

£5 to the widow, aged 68, of a registered chemist and druggist.

One case had been deferred for further inquiries, and two applications the Committee had declined to entertain.

The Secretary had submitted a statement with regard to the Isherwood orphans, showing that the fund subscribed for their support was exhausted. A letter had been received from the gentleman with whom the two boys were placed, saying he should be happy to wait on the Committee with the boys in January next.

With regard to Mr. Robbins's special donation the Secretary had reported that only one of the annuitants had subscribed to the Fund, and it had been therefore resolved to recommend that £5 be given to her before Christmas.

The report and recommendations were unanimously adopted.

Mr. ROBBINS said it was rather astonishing to hear that out of the thirty-six annuitants at present on the list only one had been a subscriber to the Benevolent Fund. He hoped this would not be found to be the case in future years.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The report of the Librarian had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
October . .	Day . .	592	32	11	23 nearly
	Evening	207	17	5	9

Circulation of books.	Town.	Country.	Total.
No. of entries . . .	199	164	363

Carriage paid, £1 10*s.* 5*d.*

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Index-catalogue of the Library of the Surgeon-General's Office, U.S. Army, vol. 3.
From the SURGEON-GENERAL.

Flückiger (F. A.), Die Chinarinden, 1883.
Archiv der Pharmacie, Separat-Abdruck, 1882.
From Professor FLÜCKIGER.

The Committee recommended the purchase of the undermentioned books:—

Candolle (Alph. de), Origine des plantes cultivées, 1883.
Davies (T.), The preparation and mounting of microscopic objects, 1881.
Hager (H.), Commentar zur Pharmacopœa Germanica.
Lunge (G.), Treatise on the distillation of coal-tar and ammoniacal liquor, 1882.
— Theoretical and practical treatise on the manufacture of sulphuric acid and alkali, 1879–80. 3 vols.
Pomet (P.), History of drugs, 1748.
Sachs (J.), Text-book of botany, 2nd ed., 1882.

Curator's Report.

The Curator had reported the average attendance in the Museum to have been—

Attendance.		Total.	Highest.	Lowest.	Average.
October. .	Morning	410	25	2	16
	Evening	115	17	0	5

The following donations to the Museum had been received and the Committee recommended that the usual letters of thanks be sent to the respective donors:—

Specimen of *Humulus Lupulus* with monœcious flowers. From Mr. H. O. HUSKISSON.

An orginal bottle of Persian Rose Water.
From Messrs. CHRISTY and Co.

Specimens of Crude and Pure Chinoline and Tartrate of Chinoline prepared from Cinchonine; Chinoline and Tartrate of Chinoline obtained from Coal-tar.
From Messrs. HOPKIN and WILLLIAMS.

Specimens of the following Brazilian drugs:—Guaco, Jaquitiba Bark, Cipo Chumbo, Milhomens.
From M. EUGENE COLLIN.

Specimens of Almasça (Brazilian Elemi), Oil of *Carapa guianensis*, Guassatunga Bark.
From Dr. SYMES.

Specimen of Winter's Bark.
From Mr. G. B. FRANCIS.

Specimens of Spurious Calumba Root and Bengal Cardamoms.
From Messrs. BURGOYNE, BURBRIDGES, CYRIAX and FARRIES.

Specimens of Adonidin, Tannate of Cannabine, Convallarin and Convallamarin.
From Messrs. E. MERCK and Co., Darmstadt.

A series of Herbarium specimens of various species of Aconite.
From Professor MAXIMOWICZ, St. Petersburg.

A series of packages of Cinchona bark from the Darjeeling Plantations.
Prom the INDIAN GOVERNMENT.

Specimens of False Buchu (*Empleurum serrulatum*), of *Barosma ericifolia* and of False Calisaya Bark.
From Messrs. DONALD GRAY and SON.

Specimen of False Buchu leaves.
From Messrs. DALTON and YOUNG.

Specimen of False Senega root (*Polygala Boykinii*).
From Professor J. MAISCH.

A letter of thanks had been received from the Director of the Royal Gardens, Kew, for duplicate specimens of drugs.

The Professors had attended and reported satisfactorily as to their respective classes.

Estimates for printing the Register and Calendar had been considered and were recommended for acceptance.

The Committee recommended that the list of subscribers to the Benevolent Fund be published in the Journal for the last week in February.

It was also recommended that the fire policies on the Society's premises and property be increased to £18,900 in the aggregate.

The Council went into committee to consider some parts of the above report.

On resuming, the report and recommendations of the Committee were received and adopted.

LAW AND PARLIAMENTARY.

The Council went into committee to consider this report. After considerable discussion the Council resumed and the report was received and adopted.

The PRESIDENT reported that, having taken steps to ascertain the views of the department in regard to further legislation, he had had an interview with Mr. Peel and the following correspondence had taken place since that interview:—

"17, Bloomsbury Square,
"*November* 13*th*, 1882.

"C. L. Peel, Esq.,
"Privy Council Office.

"Sir,—With reference to your letter of 29th July last, and the interview between yourself and the President of this Society on the 9th inst., I am instructed to inquire if their Lordships desire that the Council of this Society should prepare and submit to the Privy Council, in the form of a Bill, their views as to the amendment of the law in regard to the sale of poisons.

"I have the honour to be, Sir,
"Your obedient servant
(Signed) "ELIAS BREMRIDGE,
"*Secretary and Registrar.*"

"Council Office,
"14*th November*, 1882.

"Sir,—I have submitted to the Lord President of the Council your letter of the 13th inst., and I am directed to request that you will inform the Pharmaceutical Society that his Lordship would be glad if that Society would submit their views, in regard to the sale of poisons, for the consideration of the Lords of the Council, in the form of a draft Bill amending the existing law.

"I am, Sir,
"Your obedient servant,
(Signed) "C. L. PEEL."

The PRESIDENT announced that the Law and Parliamentary Committee was drafting a Bill, in response to the invitation of the Privy Council.

GENERAL PURPOSES.

The report of this Committee was taken in committee as usual. It included a letter from the Solicitor, stating

the progress of cases which had been placed in his hands.

Several cases of alleged infringement of the law had been considered by the Committee, and legal proceedings were recommended in three cases.

The report and recommendations were received and adopted.

Report of the Board of Examiners.

Special Recommendation respecting the Preliminary Examination.

The President said the next business had reference to a recommendation made by the Board of Examiners in England, with regard to the Preliminary examination, which had been sent to the Board in Scotland, and partly, but not altogether, agreed to by the latter body. The recommendation referred to the Latin authors to be used in future, and also to the time over which the examination should extend. It was customary for some members of the London Board of Examiners, with the President, to attend once a year the College of Preceptors, to ask for information and to take counsel together as to whether the examination was doing its work properly, and whether any suggestions could be made as to its amendment. Accordingly, last July, he with other members of the Board attended at the College of Preceptors by appointment, and had a long conversation with the examiners and with the Dean of the College. The conclusion arrived at was that, having regard to the somewhat careless way in which the subject of English was dealt with in many of the papers, it would be wise to separate that subject from Latin and Arithmetic and to give a special and separate time to it; in other words, that the present three hours devoted to the three subjects should be devoted to Latin and Arithmetic only, and that after an interval of an hour there should be another hour and a half set aside for English. It was found that, in many cases, there was a disposition on the part of the candidates to use a large portion of the time for Arithmetic, and when they came to the English they had not the opportunity to show to what extent they could come up to the requirements of the examiners. The next consideration was with regard to the Latin author. The first book of Cæsar had been used ever since there was any Preliminary examination at all, and it was recognized that it was a book still read in a very large number of schools; but it was also recognized that there were a certain number of other schools in which Virgil practically took its place, and the examiners readily assented to a suggestion which had often been made that Virgil should be added to the subjects, and that the candidate should have the option of taking a paragraph from Cæsar or Virgil at will. Of course, the object was not to get a knowledge of any particular author's Latin, but an indication that the candidate had such a knowledge of Latin as that he might be able to conduct his business satisfactorily. If the examinations were restricted to one author, candidates were compelled to read that author; and, as was well known, the peculiarities of Cæsar were almost innumerable, so that a very good Latin scholar who had not read Cæsar might find very considerable difficulty in translating a paragraph and answering questions upon it. The Council did not desire to encourage men to prepare special books, but to obtain a general standard of education in Latin and other subjects. The examiners of the College of Preceptors thought, therefore, that Virgil might very well be added, and seeing that the first book of Cæsar had been used for so long they also acceded to the suggestion that the second book of Cæsar might be added. The general conclusion come to was that two books of Cæsar and two books of the Æneid should be the standard books, and that a year's notice should, in each case, be given as to which book of each author should be selected. This suggestion was sent to the Board of Examiners in Scotland, and substantially the members of that Board agreed with their London colleagues, except that they would limit the Latin to the first book of the Æneid and the first book of Cæsar. He must confess he agreed with the London Board that it was desirable that the recommendation should be adopted in full, and he would, therefore move a resolution as follows:—

"That in future the time allowed for the Preliminary examination be four and a half hours; three hours in the morning and one hour and a half in the afternoon, with an interval of one hour between the two portions of the examination.

"That in the morning the three hours be devoted to Arithmetic and Latin, and that in the afternoon the whole time be devoted to English.

"That in Latin the present regulation requiring translation into English of a paragraph from the first book of Cæsar (De Bello Gallico) be extended as follows:—

"Two Latin subjects shall be annually selected in December by the Council from the works of the undermentioned authors, and twelve months' notice shall be given in the *Pharmaceutical Journal* of such selection:—

"*Cæsar.*—One of the first two books of the Gallic War.

"*Virgil.*—One of the first two books of the Æneid.

"That in each examination paper a passage from both of the selected books be given, but that a candidate shall be required to translate one only of such passages.

"That the Latin subjects to be selected for 1884 be:—

"*Cæsar.*—Second book of the Gallic War.

"*Virgil.*—First book of the Æneid."

Mr. Andrews asked if this would not make the examination somewhat more difficult that the Oxford and Cambridge local examinations, which were now accepted as sufficient.

The President said he thought not.

The Vice-President said he had had a good deal to do for the last ten years with the Oxford and Cambridge University examinations, and he could say that this examination, even with the addition of Virgil, would be below that standard in Latin. He had much pleasure in seconding this motion. He thought it was a great boon to have the extension of time. He had superintended the Preliminary examination for some years in Salisbury, and he found that many youths occupied nearly the whole time in the two earlier subjects, and with regard to the English, which was, after all, about as good a test of a liberal education as could be, they had to apologize, because hardly the requisite number of lines were written. He was very glad to hear they were going to get away from Cæsar for a bit; long ago he had suggested that Cornelius Nepos should have a turn. Even if there were a slight increase of stringency in the Preliminary examinations, which there was not, he should heartily approve of it, because he thought it would be a wise and kind act to put such a barrier at the outset that only those could pass it who were likely to succeed in the subsequent examination. But there was no indication of this being so. The matter had been carefully considered by the College of Preceptors, and the intention was rather to vary the extent of the Latin information than to make it more stringent.

Mr. Symes said if the proposal were to increase the stringency of the Preliminary, he should take exception to it. He did not say it was not desirable gradually to increase it somewhat, and he agreed with the Vice-President that at present it was somewhat below the Oxford and Cambridge local examinations, but whilst there was such a large percentage of failures it would not be wise to increase the stringency. The chief point to which he wished to speak was the question of time,

and he failed to see how this increase of time was at all necessary. His experience as a superintendent was that the greatest loss of time was at the beginning, and then many candidates spent a great deal of time over the first subject. He believed it would be found that the failures were very few comparatively in Latin. But assuming it was a want of time that caused them to come short in English, the conclusion would follow that the next proportion of failures would be in Arithmetic, and the larger proportion in English. But that was not so; the greatest percentage of failures was in Arithmetic, the second subject, and, therefore, it was not a question of time, but of capability. He admitted that English was often neglected for want of time, owing to too much being spent in the Arithmetic, but he thought the difficulty might be met by giving one hour to each subject. It might in some cases be objectionable to youths who had to come a long distance, to spread the examination over five and a half hours. Of course he assumed that an equal quantity of work would be put into each subject.

Mr. Hampson thought the experience of the officers of the College of Preceptors was very important. They had immense experience in this kind of examination, and they divided the subjects, and gave proper time to each. With regard to including two other books in Latin he did not see any great hardship in it. The first book of Cæsar had become so hackneyed that it was quite time to have a change.

Mr. Borland was glad to find there was a substantial agreement between the two Boards of Examiners with regard to the increased time given to Latin and Arithmetic, but he certainly thought that in the face of coming legislation and with the prospects of an enforced curriculum the Preliminary examinations should not be made any more stringent than at present, and the statistics did not appear to show that there was any great proportion of failures in Latin. He did not object to the introduction of another book in addition to Cæsar, which would to a certain extent be in favour of the candidates. In Scotch schools it was quite customary for the teachers to have a *penchant* for a certain author, and a boy after he had passed through the rudimentary stage was set to translate it, and if he had an aversion to Cæsar he was pushed on to Virgil. If the resolution come to by the Scotch Board were adopted it would give the candidate an opportunity of presenting himself at an earlier period than if he had to go on for another half year at school studying the second book of Cæsar, which might be selected by the Council for the year in which he was to come up. With regard to the Latin examination it should not be overlooked that the Board of Examiners had a double opportunity to examine the candidates in Latin, because this was a point in the Minor examination in reading prescriptions, and it had been noticed by Dr. Greenhow that many candidates failed in reading Latin prescriptions. During the time when he was examiner in Edinburgh he was often obliged to remit candidates back to their studies from the imperfect knowledge of Latin which they exhibited in reading prescriptions. They could tell what was meant, but could not read the numerals or give the terminations. He, therefore, thought it was rather too much, at the present time, to include two books in each author. There was great difficulty in Scotland generally to find apprentices to enter the business, and if the stringency of the examinations were in any way increased this difficulty would also increase. He had no doubt that the object of the examiners was to bring into the business a class of young men whose parents were in a position to keep them longer at school, but it was very doubtful whether a sufficient number of such youths was forthcoming.

Mr. Williams said he should support the proposition, because he did not see that it was at all objectionable, or that it would practically increase the stringency of the examination. He should only suggest an alteration of the wording of it, because he did not think it was the province of the Council to select the subjects; the examination was submitted to the Board of Examiners, to whom it ought to be left.

The President said it must be done by the Council ultimately, and it was much more convenient for the Council to act in the first place, otherwise there might be a delay of six months.

Mr. Borland said he should move as an amendment, that the recommendation of Board of Examiners in Scotland be adopted. He moved—

"That the recommendation of the Board of Examiners in England be adopted, excepting in so far that the examination in Latin be confined to the first book Cæsar and first book of Virgil's Æneid."

Mr. Young seconded the amendment. He considered this was a very important matter; there had been frequent complaints made of the number of failures in connection with the Preliminary examination, and it appeared to him very strange in that state of matters that the stringency of the examination should be increased, and that would be the tendency, whatever might be said to the contrary. No doubt it was a good thing that there should be an option to take Virgil instead of Cæsar, but he saw no reason for going beyond the first book of each. One gentleman said the first book had been used so long that it was become quite hackneyed; but it must be remembered that it was a different set of boys who came up each time, and although the teachers might have got tired of picking out the paragraphs, they were quite new to the lads who had to translate them. For all the Latin which was really wanted in connection with the business, one who could translate properly the first book of Cæsar had a very fair knowledge, and it would entail a great deal of extra trouble if he had to make himself proficient in the second book. It took a good time at school to get through the second book of Cæsar, and therefore he thought at present the Council might be satisfied with adding the first book of Virgil, so as to give the youths an option and to increase the time so as to show there was really a desire that they should pass. He did not agree with Mr. Williams's suggestion, for he thought the Council should have the control of the whole matter.

Mr. Andrews thought anything which tended to bring the Preliminary examination on a par with the Oxford and Cambridge local examinations was decidedly desirable, as otherwise the candidates did not all start fair. He thought Mr. Borland and Mr. Young were rather opposed to each other as to one point. If Latin were properly taught, the boy ought to be able to translate the second book of a work as easily as the first. The fact was that now youths learnt the whole of the first book by heart, but did not learn the language properly, so that it was no test at all. If a boy knew Latin he could translate the whole of the Æneid properly as well as the first book. He thought it was a very good suggestion to add Virgil, because boys might be taught Latin very well and yet not be able to translate Cæsar, unless they had specially studied it. He had heard of one case in which a boy knew the first book of Cæsar so well that he translated a passage which was not set.

Mr. Radley suggested that the question of time was of great importance in some parts of the country, and he feared if it was extended as proposed, it might sometimes involve youths being away a night from home, which was rather objectionable.

Mr. Schacht said the scheme as put forward by the English Board contained a great deal with which he strongly sympathized. The enlargement of the scope over which the examination extended from one book of one author to two books of two authors was a decided improvement, nor did he fancy the extension to two books of either author was at all too much; but it did strike him there was a weak point in the recommendation of the English Board which, if removed, might possibly meet the objection raised by the amendment. The weak point in the recommendation was the sugges-

tion that the Council should each year select the Latin subjects. Why should not the examination papers contain a set of questions from each of the authors, giving the candidate the alternative of answering whichever he pleased?

The PRESIDENT said that was intended.

Mr. SCHACHT asked, if that were so, where was the necessity for indicating the book selected. There was no doubt many preceptors trained their pupils in Virgil rather than Cæsar, and those who had been trained in Virgil would have to study Cæsar for a considerable time in order to be able to answer any questions upon it; but those who had been decently trained might be fairly supposed capable of answering questions on either of two books of the author they had studied.

The PRESIDENT said there would be an objection to having four passages on the examination papers. The examiners would have preferred only one.

Mr. SCHACHT said he did not propose that passages from all four books should be set, but that the examiners might choose from either.

The PRESIDENT said that would probably meet the views of the London Board entirely, but was not what Mr. Borland desired.

Mr. YOUNG said the amendment was simply addressed to confining the examination in Latin to the first book in Virgil or Cæsar, the candidate having the option of choosing a passage from one author or the other.

The PRESIDENT thought Mr. Schacht's view was the right one, and that eventually it must be adopted; but it was necessary to proceed gradually, and it had been long the custom in all examinations in which classics formed a part to give the actual book selected.

Mr. BOTTLE supported the amendment because he thought it extremely desirable that the two Boards of Examiners should act in perfect accord; and even if the Scotch Board had agreed with the recommendation of the English Board he should have accepted it with some compunction, because he thought it unwise at the present moment to even appear to increase the stringency of the examination. He also found that the preliminary examination for tho College of Surgeons only contemplated one Latin author.

Mr. SCHACHT remarked that it included Greek also.

The amendment was then put, and there were 7 votes on each side.

The President and one other member of Council did not vote.

The PRESIDENT said under these circumstances the only course for him to pursue was to vote for the minor proposition, although it was not in accordance with his own views. He must therefore declare the amendment carried.

The amendment was then put as a substantive motion and carried.

The following resolution, embodying the recommendations of the Board of Examiners as altered by the above amendment, was then put and carried unanimously:—

"That in future the time allowed for the Preliminary examination be four and a half hours, in two periods of three hours and one hour and a half, with an interval of one hour between the two portions of the examination.

"That the three hours be devoted to Arithmetic and Latin, and the one hour and a half to English.

"That in Latin the present regulation requiring translation into English of a paragraph from the first book of Cæsar (De Dello Gallico) be extended by the addition of Virgil—first book of the Æneid.

"That in each examination paper a passage from both of the authors be given, but that a candidate shall be required to translate one only of such passages.

"That this regulation shall come into force in January, 1884."

Mr. BUTT suggested that the Preliminary examinations in future should be held on Thursday, as it would in many cases be more convenient.

The PRESIDENT said that would have to be decided on a future occasion.

A NEW PHARMACOPŒIA.

Mr. HAMPSON said he noticed in the Journal for November 25, an article in reference to the appearance of the new German and United States Pharmacopœias, in which the Editor casually alluded to a rumour that a new edition of the British Pharmacopœia was in preparation. He was anxious to know if there had been any communication received by the President or the Secretary from the Medical Council with reference to this new edition, and whether in that communication any proposals had been made to include the Society in the preparation of this new pharmacopœia. It appeared to him that it was a most humiliating position for the Society which represented pharmacy to be utterly ignored in this matter.

The PRESIDENT said he could only reply that neither he, as President, nor the Secretary had received any communication from the Medical Council on the subject.

THE WEIGHTS AND MEASURES ACT.

The PRESIDENT read a letter which he had received from Mr. Keyworth, of Hastings, referring to the inspection of chemists' weights and measures.

The Council went into committee to consider the letter. On resuming,

The PRESIDENT said he gathered that it was the opinion of the Council that he should reply to Mr. Keyworth that in the present state of the law it was very important and desirable, wherever the Weights and Measures Act was in force, that every dispensing chemist should see not only that his larger weights and measures were correct and stamped, but that also his smaller weights and measures used in dispensing were also similarly stamped and verified; and that it was not expedient at the present moment to make any attempt on the part of the Society to alter the law on the subject.

EVENING MEETING.

Wednesday, December 6, 1882.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held on Wednesday last, the 6th inst. The chair was taken at half-past eight.

The minutes of the previous meeting having been read and confirmed, the PRESIDENT requested Mr. Holmes to read a paper on—

THE CRYSTALLINE CONSTITUENTS OF JAFFERABAD ALOES.

BY W. A. SHENSTONE.

The paper is printed on p. 461, and gave rise to the following discussion:—

Professor ATTFIELD said that Mr. Shenstone had obtained negative results, and an investigator never got so much credit for them as he did for discovering something new. At the same time it was quite clear that Mr. Shenstone had done most excellent, admirable and useful work, and he had clearly made out that the aloin obtained from the Jafferabad aloes was allied to barbaloin and not to nataloin, inasmuch as he got the chloro-, bromo- and acetyl derivatives which were obtained from barbaloin and not from nataloin.

The PRESIDENT said that one must always be struck with the tendency of investigations of this sort to show that most of the organic bodies of the same nature which yielded active principles yielded principles which were closely allied, if not identical. When a complete series of investigations should have been made into all the varieties of aloes, such as Dr. Tilden and Mr. Shenstone had already made into the more important varieties, it would be possible

probably to come to some definite conclusion with regard to them, which would be of real practical value in pharmacy. Mr. Shenstone was a former distinguished student of the Society and was now teaching chemistry at Clifton College. The members of the Society were grateful to him for continuing to take an interest in materia medica and other matters connected with pharmacy.

The next paper read was—

On the Sale by Public Auction of Spurious and Worthless Drugs.

BY E. M. HOLMES.

The paper is printed at p. 462, and gave rise to the following discussion:—

The President said he would venture to suggest that in the discussion the speakers should avoid going into purely trade matters. He had no doubt that Mr. Holmes's object was to elicit information from the members about their experience in actual pharmaceutical practice, as to the extent of adulteration, and to assist buyers in detecting fraud. The difficulties which were so ably presented in the paper were difficulties which even the most practised eye could not at all times overcome, and there could exist no better proof than that fact of the necessity for there being a trained and educated body of pharmacists. Fortunately there was a very large staff of excellent pharmacists spread all over the country, and he thought that it was to the credit of the Pharmaceutical Society of Great Britain, that it had disposed and encouraged buyers in the sale rooms of the City of London to be as careful as such men could be. He hoped that the discussion would be confined as much as possible to a statement of further instances of detected adulteration. The purely trade side of the question was adapted rather for consideration by a small committee of half-a-dozen men, than for discussion at such a meeting as the present. Perhaps the paper might be taken to be a general comment upon the way in which things were bought in the City. He would ask Mr. Umney, who was in the habit of buying on the east of Temple Bar, to open the discussion.

Mr. Umney said that he felt that the paper was a most important one. It was important for the pharmacist, because he was watched on one side by the medical practitioner, and on the other side by the public, and he sometimes was blamed if the effects of the drugs he sold or dispensed did not answer the expectations of the medical man. He could conceive no better action on the part of a pharmacist than to point out adulteration and to hound it down unflinchingly. He knew that the members of the wholesale trade generally were quite as anxious as the retail pharmacist to prevent adulteration. The responsibility of the wholesale druggist was very great. There was an Act known as "The Sale of Food and Drugs Act," and retail traders had their remedy against the wholesale dealers for supplying them with anything which was not of the nature and character demanded. For officinal drugs and preparations wholesale traders were quite ready to be judged by the standard described under "Characters and Tests" in the British Pharmacopœia. Mr. Holmes had very properly alluded to impurities which could not be well avoided, as in the case of scammony and other drugs which were collected by peasants. Such things came into the market and they were an unavoidable evil. Cheap drugs were generally said to be an abomination, and while this was undoubtedly true of such bodies as saffron and other drugs which were adulterated to make qualities to be sold at lower rates, it was not strictly true that all medicinal substances can be so classed. Take, for instance, ginger, and contrast African or Bengal with fine Jamaica ginger. Both were equally genuine, but their prices varied from, say, £25 to £100 per ton. Pharmacists should not lose sight of these important differences, when, from economical points of view, they were making purchases. Again, saffron might be very fairly genuine as a commercial article and yet not genuine from a botanical point of view. Ten or fifteen per cent. of the stamens might be present in consequence of the drug having been gathered carelessly, but he did think that could be fairly called a gross adulteration. One bad form of drug to which Mr. Holmes had alluded was that known in trade as Alicante saffron. All good houses ignored such an article. They knew that it was loaded either with carbonate of lime or carbonate of baryta or, perhaps, sulphate of baryta made adherent by glycerine or some such body. He had again and again taken samples of saffron exposed on the brokers show-boards and infused them in water and obtained after a few hours a sediment which, upon being treated with hydrochloric acid and the solution examined, gave conclusive evidence of adulteration. No one who had been in the habit of using his other senses besides his eyes could be deceived. He, personally, could generally distinguish loaded saffron by the harsh feel which it presented to the touch. If pharmacists would avoid such drugs, they would very soon cease to exist in the market, because where there were no buyers there would be no sellers. Such drugs were sold to a less extent than they were eight or ten years ago. The Sale of Food and Drugs Act had done wonders both for druggists and for the community in general. As to Ionidium ipecacuanha, or white ipecacuanha, he saw some offered in London about two years ago. It was purchased by continental buyers. He was confident that none of it found its way into British pharmacy. He could not see that there was any reason for using it as an adulterant for senega, for the price of that drug was only 15 or 20 per cent. more than that of this particular ipecacuanha. Perhaps the adulteration arose from ignorance. As to rose petals, the adulteration of that article had been very ably exposed by Mr. T. E. Greenish. He (Mr. Umney) knew of no artifice which was so difficult to detect as one in which the chemist had applied his scientific skill for the purpose of deceit. He had not met with such jalap as that to which Mr. Holmes had alluded. The specimen on the table appeared to have been sliced. Perhaps this had been done for the purpose of better extracting the resinous principle, but the whole of the resin could not have been extracted from the specimen, sliced as it had been.

Mr. Cleaver said that with regard to ipecacuanha and jalap one important consideration was the small number of pharmacists who made their own preparations from those drugs. Excepting those who did make their own preparations, perhaps not one pharmacist in a hundred ever saw a sample of jalap root or of ipecacuanha root in its natural state. He did not suppose that such drugs as Mr. Holmes had exhibited would be used by any manufacturing pharmacist. Still there was no doubt that many preparations failed to come up to the mark, but they were not all of English manufacture. He had met with alcoholic extract of hyoscyamus and alcoholic extract of aconite, which came from the continent, and which were devoid either of hyoscyamine or of aconitine, though the manufacturer vouched for their being genuine. Easton's syrup also might be met with in this country, containing only one-fourth or one-fifth of the proper proportion of quinine. He had that week seen some which contained only about 2 grains of phosphate of quinine in an ounce instead of 8 grains. He had never met with adulterated saffron.

Mr. Urwick, referring to a remark of the preceding speaker, said he believed that there was scarcely a pharmacist in England who did not make his own ipecacuanha wine. As to Easton's syrup, he thought that Mr Cleaver must be in error. He could only account for what Mr. Cleaver had stated by supposing that the preparation had been procured from some co-operative stores.

Dr. Symes said that Mr. Urwick had said what he himself intended to say. He should not think that there was one pharmacist in a hundred who bought ipecacuanha wine and who did not have opportunities of seeing the

ipecacuanha in its original condition and of judging of its character.

Mr. CLEAVER said that his remarks did not apply to those who made their own ipecacuanha wine. He should think that there was a very large number who did not do so.

Mr. GREENISH recommended pharmacists generally to take care of themselves in the matter of the drugs which entered their establishments. As to pharmaceutical preparations such as that to which Mr. Cleaver had alluded, if they went into that subject they would occupy many hours with the discussion. It was surprising that there should still be found in the market rose leaves dyed with aniline, since the fraud had been exposed in that room, and the detection of it was so easy and rapid. The adulterated saffron which Mr. Holmes had shown them was charged with a very large quantity of sulphate of barium, and more than he had seen in any previous sample. It had been stated that there was some glucose in connection with it; but from the cursory examination which he (Mr. Greenish) had made of it, he thought that the substance was honey and not glucose, for under the microscope he detected the pollen grains of other flowers than those either of saffron or calendula. He could not understand how it was that the jalap was in that sliced condition, or "slashed" as it was termed. The slicing must have been done when the jalap was quite fresh, and with some object. Judging from the appearance of the jalap under the microscope, he was disposed to think that this sample never had much resin in it; and he did not think that it could be exhausted of its resin by being boiled in alcohol in its present condition. He recommended pharmacists to use the microscope for the detection of the adulteration of drugs. It did not take three minutes to distinguish adulterated saffron.

Professor ATTFIELD said that he did not think that Mr. Holmes made any allusion, in reading his paper, to the use of glucose for the purpose of making the adulterants adhere to the saffron. He thought that if Mr. Crowe had been present he would tell them that he looked for glucose, and that he did not find more sugar in the so-called adulterated saffron than there was in the original article. Possibly gum or glycerine might have been used in this case, but not glucose or honey.

Mr. HOLMES said that Mr. Crowe at first thought that glucose had been used, but on experimenting further he failed to get absolute proof of the fact.

Professor BENTLEY said that he must add his testimony in confirmation of what Mr. Umney had said as to the very careful manner in which drugs were selected by the wholesale druggists before they got distributed among retail pharmacists. Cases of difficulty sometimes occurred, for drugs were bought from sample, but it was surprising how few mistakes were made. Some years ago a wholesale druggist bought in the market a very large quantity of chiretta, which was so perfectly like the official that he was deceived by its appearance. Upon some of it being supplied to a retail pharmacist it was noticed that the infusion was less bitter than usual. The wholesale buyer having been informed of the fact, he immediately sent a specimen to him (Professor Bentley) to be examined. He was himself almost deceived at first sight, but on a more careful inspection he detected certain differences, and ultimately he found that it was not true chiretta at all, but an entire substitution of a drug which in India bears the name of "hill chiretta." In India there were other substances bearing that name, and it was a wonder that the article he had just alluded to had never found its way into the market previously. Since that time it had often appeared, and it was a substance as to which he should recommend particular care. True chiretta had a thin stem and a continuous yellow pith, which was at once evident when the stem was broken. In the spurious article there was scarcely any trace of pith. Another drug which had been sent to him for examination was matico, an article which was first made official when the British Pharmacopœia was first brought out. At that time, there was no such thing as true matico to be got in this country, the whole supply being used up in connection with the civil war in the United States of America. The specimen which was sent to him he found had not been obtained from *Artanthe elongata*, but from *Artanthe adunca*. This was another substance which now occasionally appeared in the market. Almost all the specimens which he obtained of these spurious or adulterated articles were sent to him by wholesale druggists when they were in doubt as to their genuineness. Saffron was a thing which he had had frequently sent to him. It was very easy to be deceived as to this substance upon casual inspection. He did not agree, however, that the presence of stamens in saffron was due to carelessness in gathering; he had no doubt that they were introduced as a systematic adulteration and not through ignorance. He should like to ask Mr. Holmes whether he had tried the specimen of jalap with ether instead of alcohol, if not, the experiment would be well worth trying. The body might contain an active resin, though it might not be the resin of jalap. There was a jalap called woody jalap; and there was the common Tampico jalap, the active resin of which was soluble in ether. It must be borne in mind that the substance now called jalapin was obtained from woody jalap. The old jalapin of Pereira was derived from the true jalap, but this was now called convolvulin.

Mr. POSTANS said that the paper illustrated the practical character of many of the papers which were read at the Evening Meetings. At present no speaker had taken up the opposite side of the question. The President had told them that there were many well-trained pharmacists distributed throughout the country, but they were chiefly the younger men, and if a discussion of this sort was not conducted with great care it would tend to get up a cry of "pure drugs and pure chemicals," more especially among medical men. If he were asked why he should put in that plea, he would refer them to page 246 of 'The Progress of Pharmacy.' It would there be found that a similar discussion arose some years ago, and it tended to become rather a bore than anything else, inasmuch as it created a certain amount of want of confidence in pharmacists generally. The subject was one which ought to be considered very carefully by the Council. The pith of the whole matter seemed to be involved in that part of the paper which said, "to prevent altogether the sale of drugs for which some use might be found, would be an act of injustice." As a Society, they must draw the line somewhere. Would they draw it at best, or would they make the question one of price? As a Society, they would have to decide that very important question.

Mr. SCHACHT said he was anxious that an observation should be made upon the sentiment which seemed to pervade the paper. Mr. Holmes seemed to imply that very little real good would come of the exposure of the wrong-doings of which the paper spoke. He should be sorry that such a statement should pass unchallenged. If exposure were not a complete remedy he would venture to say that it was the first step in the only process which commended itself to his mind for the solution of the difficulty. He could conceive no other legitimate process than thorough exposure and the diffusion of information on the subject, such as would lead pharmacists to decline to buy an inferior or spurious article merely because it was low priced. Although Mr. Holmes hinted at something stronger, he (Mr. Schacht) believed that he was aiming at the impossible, namely, the making of men virtuous by Act of Parliament. The scientific portions of such papers as the present, and the raising of discussions upon them, would be of eminent practical good in bringing about the cessation of the evil which all so much deplored.

Mr. HAMPSON said that Mr. Schacht had almost taken

from his lips the words which he had intended to say. He felt sure that if statistics could be obtained it would be found that adulteration had considerably diminished rather than increased; or else the Society would not have done any service by promoting and extending pharmaceutical education. It was perhaps desirable for pharmacists to have their attention called occasionally to the evils which existed, and such an exposure as this paper brought about was most important. Further, he had no hesitation in saying that exposure was the only remedy, especially where scientific men were concerned. They needed no other distinct influences than education and their own palpable self-interest. Considering the peculiar circumstances under which many drugs were collected it was a wonder that there was not more adulteration. When a pharmacist detected an adulteration let him add it to the chamber of horrors which already existed in the Museum of the Society.

Mr. Plowman said that a case of complete substitution of one drug for another had recently come under his notice. A parcel of copalchi bark had been supplied instead of cusparia bark, and there was not a single shred of the latter present. It was only right to add that the wholesale house expressed its sense of obligation to him for pointing out the substitution.

Mr. Long sympathized with the view expressed by Mr. Postans. He hoped that it would go forth that the adulterations which had been exposed were quite exceptional and were not the rule. The Society had done an immense work, and the present condition of things was very different from that which existed when he attended Dr. Pereira's lectures. The President had said that they ought not to talk about trade questions, such as the price of the drugs, but as pharmacists could not go and gather the drugs for themselves there was, fortunately, a systematized process for supplying them. A gentleman at an examination, when asked where jalap came from, said, "It comes from the wholesale druggist in 2-pound parcels." Pharmacists were supplied by the wholesale druggists, and he was glad to find that these matters were of sufficient interest to them to induce many of them to enter the ranks of the Society. The wholesale druggists were one with the retail pharmacists, and they knew their wants and endeavoured to supply them well. There would be much more difficulty if it was not for the discrimination and care exercised in the wholesale trade. There were many wholesale men now-a-days to whom it would be futile to attempt to sell the rubbishing things which used to be offered. The drug trade was as good in England as in any part of the globe, and better than it was in some places.

Mr. Atkins thought that the introduction of this matter for discussion had been singularly fortunate. The whole discussion had tended to produce in his mind the conviction that there had been much more smoke than fire. He had a growing belief that there was much less adulteration of drugs than had been represented by medical journals both in England and abroad. If they could exorcise this "bogey" the discussion of the subject would be of great service. He might say, however, that one of the fundamental principles of the Society was the utter condemnation and extermination of adulteration. He knew of no better means of accomplishing that result than a perfected education. It might be asserted generally that, other things being equal, a higher moral sensibility was a collateral result of a more perfected education. He believed that in the dispersion throughout the country of a trained body of men, such as was now being rapidly accomplished by the Society, the end in view was being accomplished in two ways. Not only would the trained pharmacist himself decline to receive an imperfect article or expose it if he had received it, but, if there was a black sheep in the wholesale trade who would be willing to trade upon the ignorance of others, he would be deterred from doing so by the knowledge that his fraud would be exploded.

The President said that he would ask Mr. Holmes to reply to the materia medica aspect of the remarks which had been made. As the speakers had not confined themselves strictly to the scientific side of the question, but had unconsciously departed from the dictum which he had laid down at the commencement of the discussion, he might be allowed to point out that pharmacists were not the only persons who bought drugs, and it would be very wrong, in a moral sense, for them to be hasty in their judgment, or to express any harsh views against wholesale dealers or brokers. It should be borne in mind that the City of London was the drug market of the world, and that there were sold there, in quantities of hundreds of tons, many drugs of which educated pharmacists did not even know the name; and therefore, wholesale druggists might be excused if they were now and then deceived.

Mr. Holmes, referring first to Mr. Cleaver's remarks, said that he had had some years' experience in the Museum, and he could say, unhesitatingly, that he had never met with a student, who did not know the appearance of ipecacuanha root or true jalap root before he came to the Society. But he had met with many who did not know the appearance of the inferior or Tampico jalap. With reference to the incisions which were made on the specimen of jalap, it appeared to him that they were made after the root had been soaked in water, and that afterwards the root had been exhausted with benzole or petroleum spirit or something of that kind. The outside appearance seemed to indicate that some solvent had been used. With regard to Professor Bentley's remarks on matico, only during the present month he (Mr. Holmes) had seen a specimen of matico mixed with the leaves of *Artanthe adunca*, just as it occurred occasionally in commerce. As to Mr. Schacht's remarks, he (Mr. Holmes) had found that short articles, published occasionally in the Journal, respecting adulteration, did not receive as much attention as was called to the subject when the spurious articles could be seen. He had, therefore, preferred bringing forward the subject at an Evening Meeting. The President had very justly remarked that London was the drug market of the world. That being so they ought to pay some attention to the mode in which adulterations occurred. He thought that wholesale druggists would bear him out in the statement that England had perhaps fewer drug adulterations than any other country in the world. He had been told that the adulterated drugs in the London market did not, as a rule, pass into use in this country, but that the greater proportion of them went either to the continent or to South America, or elsewhere. He might safely say that when they found their way among English pharmacists, it was rather from accident than from intention; but, be that as it might, it was important that the fact should be known, especially in those cases in which the adulteration was difficult to detect.

A paper was then read, entitled—

Further Observations on Arsenic.

BY W. A. H. NAYLOR AND J. O. BRAITHWAITE.

The paper is printed on p. 464 and gave rise to the following discutsion:—

The President said that these analytical subjects were of extreme importance both to pharmacists and to chemists generally. The statements of observers with regard to analytical results were frequently copied from manual to manual, so that if an error once crept in, it might be perpetuated for many generations. Personally, he felt very much indebted to the authors for having given them an opportunity of listening to the paper, and for having, in a former paper, discussed the action of oxalic acid upon arsenic acid. They had now somewhat completely, as he thought, dealt with the action of oxalic acid upon alkaline arseniates.

Professor ATTFIELD said, with regard to the general question which the President had just raised, that authors of manuals were the very men who would most thank gentlemen like Mr. Naylor for doing work of the kind described.

The PRESIDENT said that if there was a paucity of discussion on the present paper it must be understood to arise from the very completeness of the investigation, and not from any lack of interest in the subject. The style of work described in the paper was just that which, as President, he liked to see brought forward. It consisted of a series of experiments performed under the most careful conditions, accurately observed and thoroughly and conscientiously worked out. He was happy to say that this was the general character of that work of Mr. Naylor with which he was acquainted, and the same was true, in a minor sense, of Mr. Braithwaite, although he was a comparatively young worker in original research.

Mr. HOLMES called attention to certain specimens which were exhibited on the table. In the first place, there were some very perfect crystals of tartrate of soda prepared by a gentleman in the laboratory, whose father, Mr. Reynolds, of Leeds, was well known wherever pharmacy was known. There were also some new preparations on view, presented by Mr. E. Merck, of Darmstadt, including a sample of adonidin, the active principle obtained from *Adonis vernalis*. This substance was said to have the active properties of digitalin, but not its cumulative action. There was also a sample of tannate of cannabine, the active principle of Indian hemp. There were also two principles obtained from the lily of the valley. One, convallarin, was said to be inactive, and the other, convallamarin, was said to be the most powerful diuretic known. There was also a specimen of a new kind of eucalyptus oil. He believed the great bulk of what had been sold as the oil of *Eucalyptus globulus* was not obtained from that species, but from *Eucalyptus amygdalina*. There was now a great demand for the oil for dissolving india-rubber for making varnishes and other purposes, and the supply from that source was not equal to the demand; hence it was now proposed by Mr. Bosisto to prepare it from the species from which the oil exhibited had been distilled, *Eucalyptus dumosa*, which could be obtained in unlimited quantity. This oil possessed the same solvent properties as that from *E. amygdalina*. There was also a specimen, presented by Mr. Warrick, of the oil of *Eucalyptus globulus*, prepared from the leaves of the plant at Grasse. He had also to call attention to some specimens which consisted of some species of cuprea bark, presented through Dr. Paul, by Mr. Parisot, a gentleman who had recently brought them to this country from Columbia. They came from a new district, from which, probably, much larger quantities would come by-and-by. There was also on the table a specimen of the Dyak arrow poison used in Borneo. He believed that there was some difficulty in obtaining it. The present samples came from Mr. Jamie, of Singapore, who took much interest in the work of the Society. He had sent with the specimens an interesting note, in which it was stated that the poison was prepared, as far as could be learnt, from the leaf of a creeper in Borneo. The leaf was rubbed down in water into a sort of paste, and mixed with a kind of gum. All the tribes did not prepare it in the same way. Many of them used the poison of snakes in connection with this poison. Mr. Jamie stated that the late Rajah Sir James Brooke, when cases of poisoning occurred to his soldiers, used to give them intoxicating liquor until they were drunk, and that treatment generally saved their lives. The same remedy was also used in Mexico as an antidote. Perhaps there was no better antidote for snake poison than alcohol.

The PRESIDENT announced that the next meeting would be held on February 7, 1883.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A meeting of the pharmacists of Bristol and the neighbourhood was held at the Museum and Library on Friday, November 24, for the purpose of discussing the recent action of the Pharmaceutical Society of Great Britain in respect of certain proposed modifications in the conditions for examination of future candidates for for pharmacy. Mr. Schacht, the President of the local Association, occupied the chair.

The Chairman, in opening the proceedings, explained that the cause which had forced the Council of the Pharmaceutical Society to a consideration of this subject was the continually recurring evidence of the deficiency of proper training with which so many candidates presented themselves for the examinations, and which rendered the conduct of those examinations so difficult and so unsatisfactory to all concerned in them. He begged the meeting to believe that the single idea in the mind of the Council throughout all its inquiries and deliberations had been to devise a scheme which should promote a more general state of efficient qualification amongst those who aspired to the important work of pharmacy; and as a necessary consequence to enable the student to regard the pharmaceutical examinations no longer as a stumbling block in his path, but simply as the stamp of his qualification. It had not aimed at any undue exaltation of the standard of scientific attainment in the pharmacist, but rather that the standard now admitted to be requisite for the proper fulfilment of duty should be more generally achieved and more certainly secured. Many of the details of the proposed scheme were, as they knew, published in the *Pharmaceutical Journal* of April 15th of this year, and the chief points of the scheme as at present matured were:—1st. That one of the recognized examinations in arts be passed by the candidate prior to the commencement of his apprenticeship or pupilage. 2nd. That a period of at least three years be then spent as pupil to a registered pharmacist; after which, the first portion of a technical examination be passed. 3rd. That at least one year more be then spent in further work and laboratory practice. 4th. That during these four years (or more) certain courses of lectures on chemistry, botany, and materia medica, and a practical course of instruction in a chemical laboratory—as defined by the Council, and for convenience called "a curriculum of study"—be attended. 5th. That when all this has been fulfilled, the candidate present himself for the final portion of the qualifying examination. He did not mean to state that every point he had named had, as yet, been fully adopted by the Council, but that such was the direction in which opinion was moving, and he should be glad to hear what was thought of the whole matter by those then present.

Mr. Berry inquired if the Council of the Pharmaceutical Society, in view of its own efforts to enforce a compulsory curriculum, was prepared to offer substantial aid to provincial centres of education.

Mr. Towerzey thought that most probably ample instruction in chemistry and botany could be obtained at the scientific institutions already established in many of the larger provincial towns; but he was afraid the subject of materia medica was nowhere taught out of London as the Council required it to be taught.

Mr. Toone (of Bath) wished to urge a consideration which had long occupied his thoughts. It seemed to him unfortunate that the authorities should so completely lose sight of the student during the three years of his pupilage. He felt inclined to urge that a students' examination be held annually, as a method of keeping alive their interest in scientific knowledge and as an inducement to work.

Mr. Keevil regarded such duties as belonging rather to

the master than to any outside authority. He was afraid the contemplated changes would press hardly upon country apprentices, nevertheless he was bound to admit them to be changes in the right direction. It would certainly be a great convenience to all provincial students if the first portion of the pass examination could be held at certain provincial centres as well as in London.

Mr. Isaac supported the idea that the Pharmaceutical Society should assist in providing, if it did not altogether provide, good lecture teaching at a certain number of well-selected centres in the provinces.

Mr. Wretts was of the same opinion, especially in regard to the subject of materia medica, which he thought was little likely to be taught at ordinary science schools or colleges unless subsidised and supervised by the Pharmaceutical Society.

Mr. Towerzey repeated the opinion that the Society ought to endow a certain number of chairs of materia medica throughout the provinces. It appeared to him that unless it was prepared to do something of this sort for the general benefit of pharmacy its plain duty was to discontinue its endowment of the School at Bloomsbury Square.

Mr. White warmly advocated the institution of a "curriculum." He could not admit that its being made compulsory inflicted hardship upon anyone, not even the country apprentice; for it would be strange to call that a hardship which entailed upon its supposed victims nothing but benefit. With regard to the supply of provincial teaching he thought they might fairly expect that to appear when the requisite demand arose.

Mr. Keevil suggested that the work in the practical laboratory might with advantage be distributed over a longer time than laid down in the syllabus; it might be well to say the time should not be less than four months, but he thought that should be the only limiting expression.

Mr. Algernon Warren expressed approval of the changes proposed by the Council, and thought that any possible increase of difficulty they might entail on the country apprentice would be compensated by the arrangement suggested, of dividing the examination into two portions and holding the former at a number of provincial centres.

The Chairman replied generally to the several speakers upon the points raised, and answered a number of questions.

The following resolutions were then proposed, seconded and carried unanimously:—

"1. That this meeting approves the principle of a compulsory curriculum of study for all future candidates for pharmacy."

"2. That this meeting approves the action of the Council of the Pharmaceutical Society of Great Britain in respect of the proposed modifications of the conditions for the examination of future candidates for pharmacy, as far as that action has been made public."

"3. That this meeting is of opinion that it would add greatly to the convenience of examinees if such portions of the examination as can be properly conducted by the written process were held at certain provincial centres as well as in London and Edinburgh."

A vote of thanks to the Chairman concluded the proceedings.

Erratum.—On p. 406, col. ii., line 11 from bottom, as the name of the gentleman appointed Sheriff of Poole, *for* "Mr. T. W. Atkinson" *read* "Mr. T. W. Atkins."

Mr. Rotter.—Your letter, which should have been sent direct to the Editor instead of through the Publishers, was received too late to allow of dealing with it in the present number.

J. K.—(1) See a paper on oleate of bismuth in vol. xi., p. 869. (2) For oleate of zinc see the present volume, before, p. 303. (3) For oleate of mercury see vol. xi., p. 592.

Correspondence.

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

A Proposal as to Lectures.

Sir,—Now that the business of the various societies in London has fairly commenced, is it too much to ask that our professors should entertain the members occasionally with lectures on some popular topic connected with science; or are such discourses left entirely in the hands of the Committees of the Royal Institution and the Society of Arts? Surely it is time that the theatre at Bloomsbury Square and the latent power at number seventeen should be turned to use on behalf of the members in some such manner as that described. This, I believe, would be wise; and I will add still more, that, in my opinion, such reunions would tend greatly to cement together in the kindly feeling of one common brotherhood many who might not otherwise be drawn within the circle of membership. Cowper says:—

"Knowledge and wisdom, far from being one,
Have oft times no connexion. Knowledge dwells
In heads replete with thoughts of other men;
Wisdom in minds attentive to their own.
Knowledge is proud, that he has learnt so much;
Wisdom is humble, that he knows no more."

35, *Baker Street, W.* A. W. Postans.

The Death of Mr. Cyrus Buott.

Sir,—It is my melancholy duty to announce the death of Mr. Cyrus Buott, late Secretary of the United Society of Chemists and Druggists. He was released from his sufferings on November 26, at the ripe age of 82 years.

Both he and his devoted daughter frequently expressed their gratitude for the kindness and generosity of those who contributed to their support during a period of struggle and distress. And Mr. Buott, shortly before he died, earnestly requested that I should give public expression to those feelings. I, too, have to express my gratitude that I have been privileged, by the sympathetic co-operation of many generous friends, to give kindly aid to Mr. Buott. Appended is a final statement of the donations I have received since my last acknowledgment. I need scarcely say that all sums that have been sent have been safely and carefully disbursed.

I most sincerely thank all those who united with me in this benevolent transaction. They with me have experienced the joy of doing a little good.

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Communications, Letters, etc., have been received from Messrs. Hayward, Abraham, Shenstone, Bell, Spiller, Ward, Law, K. K., E. T. D., D. M. P., 1878, Sinapis, Subacet., Suburban.

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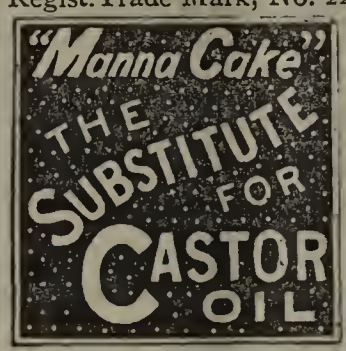

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Black Currant and Ipecacuanha ...	2/6	2/8
Black Currant and Tannin	3/0	3/3
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(*Ipecac. and Morph., strength as "B.P.")

In Bottles, 1lb., 2lbs., 4lbs., and 7lbs. For Exportation, in Soldered tins, of any size. From EDWARDS, London; through any Wholesale House; and from the Manufacturers,

RANDALL & SON, Southampton,

Who will forward Samples by post on application.

Also, BROWN COUGH LOZENGES, 2s., 2s. 2d.; 7lbs. stamped with name free, and MUSK LOZENGES (*Special*), 2s. 6d., 2s. 8d.

☞ *N.B.—Medical Lozenges of every kind*, including those of the Pharmacopœia of the Hospital for Diseases of the Throat, London.

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Containing *all* the oil. Special attention is paid to this article, which we crush ourselves from Linseed expressly cleaned and selected for the purpose. In free bags, forwarded *freshly crushed* same day as order received. Price 18/6 cwt. Special quotations for 5 cwts. or more. Second quality, 17/6 cwt. Samples free.

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We have all the latest and most improved machinery for the purpose driven by steam power, and guarantee the quicksilver to be well killed and evenly distributed, and none but the best lard used.

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If our customers wish they can have all sizes of either of the above Ointments with ordinary ointment labels on, omitting our names as manufacturers, and we supply posters in the same way "gratis" with an order for Ointment.

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We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

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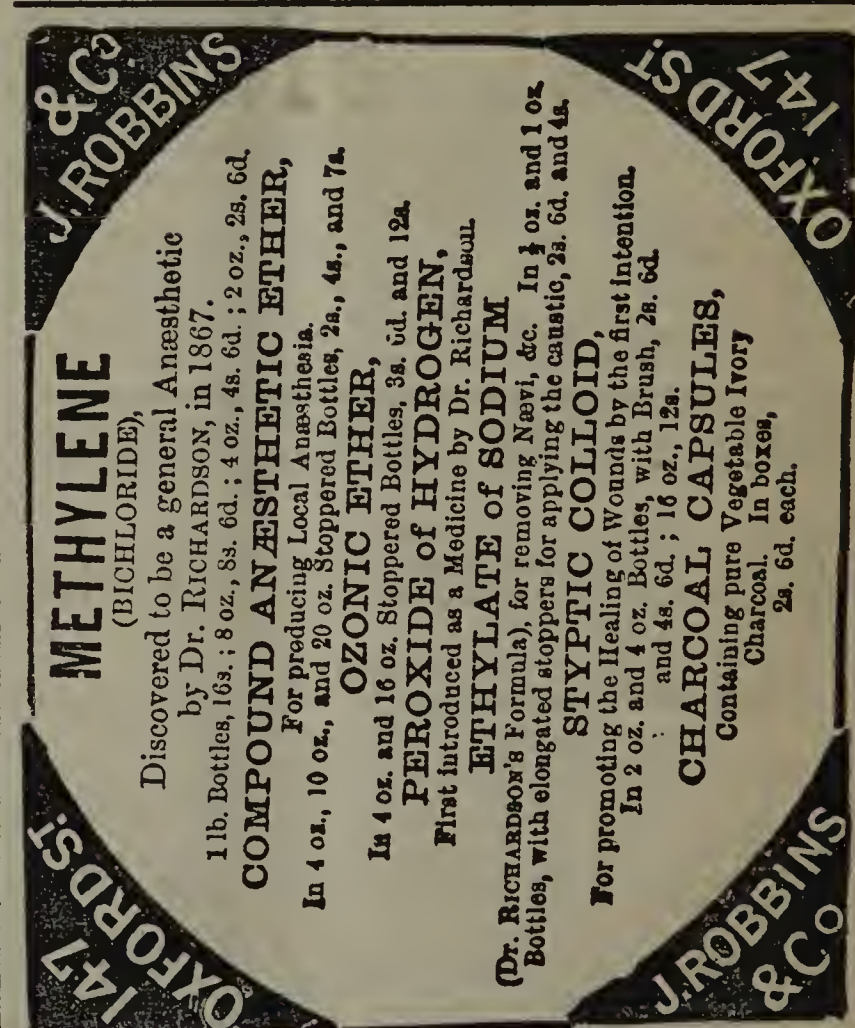

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The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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3 & 4 oz., clear blue tinted, plain or graduated	7s. 6d.
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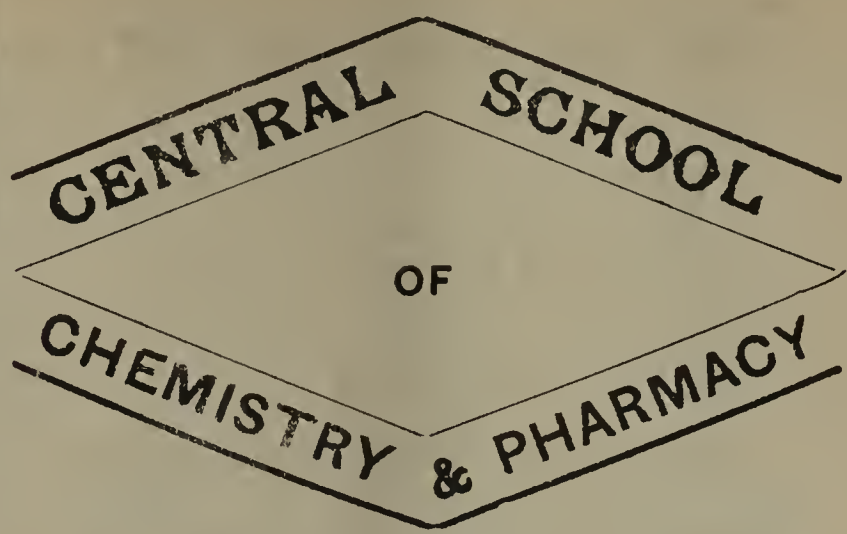

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The object of this School is to impart to Pharmaceutical Students a thorough knowledge of the subjects which are required in a pharmaceutical education of the highest standard, and which at the same time shall fit them for passing the Minor and Major Examinations of the Pharmaceutical Society.

Students are strongly advised to enter at the commencement of a Course of Lectures. Gentlemen desirous of entering should send in their names as early as possible, as there will be only a few vacancies.

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"*We have visited the Westminster College of Chemistry and Pharmacy, and with the facilities* Mr. WILLS *has at command, we can scarcely wonder that the whole of his Students pass without difficulty.*"

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The fourteenth Session, 1882-3, commenced on the 15th September. Entries can now be made for the January term.

For Syllabus, &c., apply to W. BAXTER, Secretary.

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MINOR Student, Assistant Apothecaries' Hall, Lond., offers services in return for facilities of attending lectures. Good references. H. H. MASON, Bromsgrove.

YORKSHIRE.—By qualified ASSISTANT. In West Riding. Age 28. A. CARDWELL, South Ossett, viâ Wakefield.

AS ASSISTANT, by a Swiss Pharmaceutical Chemist, speaking French, German, and English. 1 year's London experience. CADONAU, 49, Haymarket.

ENGAGEMENTS WANTED.

AS ASSISTANT in good class Dispensing and Family Retail business. Out-door. Passed Minor. State salary, hours, &c., to CHEMIST, Mr. Rossendale, Briggate, Leeds.

AS MANAGER, by active, middle-aged man, of business habits. North preferred. Married, no family. Abstainer. Registered. Excellent references. At liberty shortly. QUERCUS, Hirst, Brooke & Hirst, Leeds.

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EVENING employment by an ASSISTANT. Disengaged after 6 p.m. In London. Ætat. 26. Good references. STUDENT, 84, Isledon Rd., Holloway, N.

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AS ASSISTANT in a country business. Age 22. Height 5ft. 10in. 6½ years' experience. Disengaged. J. E. ROWELL, Barr St., Whittlesea, Peterborough.

AS DISPENSER in Hospital or to Surgeon. Age 27. Neat and accurate Dispenser. Can Prescribe and Extract Teeth. Highest testimonials. State full particulars to C. E. KING, 26, St. Clement's, Oxford.

MANAGER or ASSISTANT. In or out-door. Qualified. Married, no family. Over 15 years' varied experience. Good Dispenser, Prescriber, and can Extract Teeth. Good references. Please state salary, &c. CORTEX, The Poole, Hereford.

AS out-door ASSISTANT, MANAGER, or TEMPORARY. Major qualification. Good reference and experience. A. HODDER, 168, High St., Camden Town, N.W.

OUT-DOOR. Wholesale, Retail, MANAGE Branch, or DISPENSER to a Doctor. Married, no incumbrance. Own furniture. 16 years' experience, town and country. Age 33. State salary, &c. CHEMICUS, 114, Rotherfield St., London, N.

AS JUNIOR in a good house of business. Good experience and references. Disengaged. W. F.P., 41, Bell St., Henley-on-Thames.

EVENING engagement. In London. Could give more time if desired. Age 20. Good references. Small salary. Out-door. Disengaged beginning of January. H. INGE, Blenheim House, Medina Rd., Cowes.

AS JUNIOR. Accustomed to good class business. Can Dispense well, and is used to Laboratory work. Good reference. E. J. S., 22, Henrietta St., Bath.

BY a steady Registered Chemist, age 37 years, height 5ft. 10in., an out-door situation, or to take the entire MANAGEMENT of a Branch. First-class references. P. H., care of Messrs. Compton & Son, Pharmaceutical Chemists, Margate.

AS ASSISTANT, with time for study in lieu of part salary. Accustomed to general business, with Dispensing, Prescribing, and Extracting Teeth. Disengaged after Christmas. C. K. S., High St., Aldeburgh-on-Sea.

CHEMISTS' TEMPORARY. London and country. Well known. Apply to country address of R. E. BUNN (of 12, Unity Pl., Woolwich), 9, Friar's Rd., St. Nicholas, Ipswich, Suffolk.

IMMEDIATELY.—As TRAVELLER, DISPENSER, or in Retail, by an A.P.S. Married. Age 29. Can give 16 years' reference. W., 33, New Inn Hall St., Oxford.

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TO West-end Chemists.—Medical and Pharmaceutical ASSISTANT seeks Evening employment. Speaks French and German fluently. Good address and references. Terms from 15s. K., 7, Madras Pl., Holloway.

AS ASSISTANT. In London. Little time for study or attending lectures. Age 23. Good references. Please state particulars. J. H. S., 5, Burgess, Coventry.

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AS MANAGER of Branch or DISPENSER to Surgeon. CHEMICUS, 10, Malvern Hill Rd., Nechells, Birmingham.

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AS ASSISTANT. Out-door. London or fashionable seaport town preferred. Age 20. 6½ years' experience. Height 5ft. 7½in. Good references. FIDES, 67, Preston St., Brighton.

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A STEADY young man as JUNIOR, in country Retail. Comfortable home. Apply (enclosing carte), to CHAS. G. TARGETT, Chemist, Weymouth.

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By order. JAMES W. HILL,
Clerk's Office, Workhouse, Clerk to the Guardians.
Gray's Inn Rd., W.C.
7th December, 1882.

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By order of the Board,
THOS. JONES, Secretary.

Board Room, Dec. 5th, 1882.

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AND
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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM.

SPECIAL NOTICE.

The Library and Museum will be closed on Monday and Tuesday, December 25th and 26th, and will not be open in the Evening on December 27th, 28th, and 29th.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

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Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
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Carmarthen	Hull	Newcastle	Worcester
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* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH,

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THE CHEMISTS' SEVENTEENTH ANNUAL BALL

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Either of the two pharmacopœias that have been almost simultaneously issued, one for use in Germany and the other in the United States, is of sufficient importance and interest to British pharmacists to justify its being considered separately, and indeed in some aspects they have so little in common that they cannot be treated other than independently. Nevertheless, as there exists just now some desire for the greatest possible approximation to uniformity in the different pharmacopœias, at least in respect to the more potent drugs and preparations, it seems desirable to utilize the opportunity for observing what, if any, progress has been made in this direction in these two works, and whether they present any common ground which is favourable to further advance in connection with the preparation of other works of a similar nature. It is therefore proposed to discuss the principal features of the two pharmacopœias in one series of papers, this plan appearing to be the most convenient for those parts which allow of comparative treatment.

Before proceeding to consider in detail the contents of the new volumes, it will be as well to notice the conditions under which they have been produced, and this will involve a brief historical sketch, not without significance in relation to the very important subject of the supervision of pharmacopœias generally.

The first national United States Pharmacopœia was published in December, 1820. Before that time, as we learn from the Preface of that work, a number of pharmacopœias, and "dispensatories" founded upon them, had been produced in different parts of the Union, and various foreign works of the kind had been imported, some of which had become naturalized by republication in the country. The medical practitioners and druggists had supplied themselves with one or other of these books, and as a consequence the character of medicinal preparations was liable to vary in every state and city in the Union. Moved by this condition of affairs, Dr. Lyman Spalding, in the year 1817, submitted to the New York County Medical Society a project for the formation of a national pharmacopœia based on the authority of all the medical schools and medical societies in the United States. As a first step he proposed that the States and territories should be divided into four districts,—northern, middle, southern and western,—and that in each district a convention should be held, consisting of delegates from all incorporated medical bodies, or, failing the existence of any such in a state, from voluntary associations of physicians and surgeons; the primary business of each convention was to be to form a pharmacopœia, and then to select delegates to attend a general convention in Washington and aid in compiling from the four district pharmacopœias one national work. This plan was in the main adhered to, and the general convention entered upon its task on the 1st of January, 1820, under the presidency of Dr. Samuel L. Mitchell. Only three out of the four districts,—the northern, middle and southern,—appear to have been represented, and only the northern and middle districts submitted pharmacopœias. These, however, were compared, supplemented, and consolidated into one work, which was published at the end of the year. It was written entirely in English; but the nomenclature and all the essential parts were presented also in Latin, on the ground that, as no well-educated physician or apothecary was unacquainted with that tongue, the book might thus be rendered more intelligible to foreigners, and more useful in those districts of the United States where the French and German languages were spoken. From the foregoing it will, therefore, be seen that the United States Pharmacopœia was at its inception under purely *medical* auspices. Moreover it was and has continued to be a volunteer work, not having its origin in any legal enactment and not having any authority beyond what it may derive through the measure of acceptance granted to it by medical practitioners and pharmacists throughout the country, and the reference to it as a standard for the purity of drugs in Adulteration Acts that have been passed in some of the states.

Before adjourning, the Convention, having in view the revision of the work that would become necessary with the lapse of time, instructed its President to take preliminary steps in 1828 for holding a General Convention in Washington in 1830, to consist of three delegates from each of the four divisions, chosen by the medical colleges. Through some misunderstanding of the rather elaborate provisions as to the election, delegates from the northern and middle districts only were duly returned, and these formed the nucleus of a Convention which prepared a revised pharmacopœia that was published in New York in 1830. But the medical interests in the middle district being still unsatisfied, a fresh Convention was called, which authorized the publication of another revised pharmacopœia in Philadelphia in the following year.

The next Pharmacopœia Convention was held in Washington in 1840 and consisted entirely of delegates from incorporated medical societies and colleges. But a communication from the College of Physicians of Philadelphia having been accepted as a proper basis for a revised pharmacopœia, it was referred to a committee consisting of seven members to be worked out, with authority to the committee to request the co-operation of *colleges of pharmacy*. Invitations were accordingly addressed to the Presidents of the Colleges of Pharmacy of Boston, New York and Philadelphia, and these were responded to favourably; indeed the contribution offered by the Philadelphia college was so important that its proper consideration involved a delay in the publication of the new work until 1842. One notable point in which the United States Pharmacopœia of 1849—the first in which the pharmacists of the country took part—differed from its predecessors, was the abandonment of the duplicate descriptions in Latin, as presenting "no sufficient practical advantage to counterbalance the inconvenience of attempting to present ideas in a language which has no appropriate words to express them, and the labour and expense incurred in printing twice as much matter as is necessary to convey the meaning intended." The then recent publication of the French Codex and the Edinburgh Pharmacopœia in the vernacular languages of their respective countries was quoted as giving sanction to this course. Another point was the introduction of the "mode of filtration denominated as *displacement*" as an alternative process in the preparation of some of the vinegars, extracts, infusions and tinctures.

In making arrangements for the Convention in 1850, it was decided that invitations to send delegates should be forwarded to the incorporated colleges of pharmacy at the same time as others were sent to the medical colleges. Consequently, the New York and Philadelphia colleges were represented in the General Convention as well as in the committee entrusted with the work of revision and publication. A similar course was adopted in 1860, when the number of colleges represented was four, whilst the American Pharmaceutical Association contributed some suggestions. In the fifth decennial Convention, held in 1870, the number of colleges of pharmacy represented was further increased to eight.

But on no previous occasion have pharmacists taken so prominent a share in the revision of the United States Pharmacopœia as in the work just completed. No less than twenty-six delegates from eleven incorporated colleges of pharmacy attended the Convention; from these were selected fifteen out of twenty-five members of the committee appointed to carry out the work, the Chairman of the Committee, Dr. Rice, the two Vice-Chairmen, Messrs. Remington and Diehl, the Secretary, Mr. Bedford, and the Treasurer, Mr. Doliber, being all pharmacists. No doubt this pharmaceutical preponderance is attributable to some events that had taken place in the interval between this and the previous Convention. In 1876, Dr. Squibb, considering that the work necessary for the proper revision of a pharmacopœia could not be done by a special Convention, meeting at intervals of ten years, and moreover thinking that body, as hitherto constituted, was not sufficiently representative to be the fit custodian of the interests involved in the preparation of a national pharmacopœia, advocated an entirely new departure. The proposition of Dr. Squibb was that the revision should henceforth be placed under the charge and authority of the American Medical Association, as the representative body of the medical profession in the United States, with the understanding that the Association, whilst maintaining the control, should invite the active co-operation of the American Pharmaceutical Association. The Medical Association however declined to undertake the task, and in consequence the subject subsequently came under the consideration of the American Pharmaceutical Association during its meeting in Toronto, in 1877, when a committee was appointed to consider the advisability and feasibility of the Association arranging to draw up a complete pharmacopœia, which might be submitted to the criticisms of the medical and pharmaceutical professions and proposed to the final committee of revision. The report being in the affirmative a committee was appointed to carry out the work; but it eventually became evident that the original plan, to construct a complete pharmacopœia, was impracticable. A large quantity of valuable material was, however, collected, and this was presented at the meeting of the Pharmaceutical Association in 1879 in the form of a report, which was printed at the expense of different colleges and societies there represented. This report exercised a considerable influence upon the revision which has just been completed, and Dr. Charles Rice, who in his capacity as Chairman of the Committee drew it up, was also chosen to preside over the Committee of Revision appointed by the Convention. It is this report that is occasionally referred to in the succeeding articles.

Turning now to the European work under notice, it may be said that all the inconveniences arising from a multiplicity of pharmacopœias existed in Germany long after a national work had been accomplished in the United States. For as recently as twenty years since there were no less than ten different pharmacopœias, each being an authoritative text book in one or more German-speaking states. Indeed the first edition of the official 'Pharmacopœa Germanica' did not appear until 1872, having been drawn up by a committee acting under the authority of a decree of the Federal Council, issued immediately after the establishment of the German empire. This Pharmacopœia was not, however, original in the full sense of the word; nor was it the intention of the Committee to produce a new work. According to the Latin Preface, the main object of the Committee was to collate the formulæ in the different pharmacopœias existing in Germany, to remodel the 'Pharmacopœa Borussica' and the 'Pharmacopœa Germaniæ,' and to take into account the recognized pharmacopœias of South Germany.

In order to trace the true origin of the 'Pharmacopœa Germanica,' it is necessary to go back to a scheme for replacing the ten existing pharmacopœias by one complete and inclusive work which was worked out by nine pharmacists belonging to North and South Germany and Austria, and laid before the First International Pharmaceutical Congress, held at Brunswick, in 1865. The Congress sanctioned the printing of the scheme as a 'Pharmacopœa Germaniæ,' and the cost was covered by subscriptions. The subject appears to have been afterwards taken up jointly by the Pharmaceutical Association of North Germany and the Pharmaceutical Association of South Germany, under whose auspices alterations and improvements were made and a work was drawn up intended to be used as a national pharmacopœia in the place of the diverse pharmacopœias that were then in use in the different German states. This work was published in 1867, under the title of 'Pharmacopœa Germaniæ: Editio Altera.' It of course had no legal authority, though copies of it were forwarded to the governments of the various states for consideration and formal adoption, if approved of. But the North German Confederation, having by this time taken the place of the more loosely bound Germanic Confederation, the authorities of Mecklenburg-Schwerin called the attention of the Federal Council to the want of an authoritative national pharmacopœia, and that body in December, 1868, resolved that a committee of medical men and pharmacists should be charged with the execution of the work. The committee met in May, 1869, and determined to utilize the 'Pharmacopœa Germaniæ' which had been produced by the two great Pharmaceutical Associations of the country, together with the 'Pharmacopœa Borussica,' and to consult the medical men and pharmacists of repute and authority throughout the North German Confederation, as to the materia medica and preparations to be included. The work of the committee was, however, interrupted by the breaking out of the Franco-German war, and when this was over, the task that had to be confronted was the compilation of a national pharmacopœia for the whole of Germany, instead of for a part of it.

In 1871 a new committee was appointed, consisting of representatives of repute in the different

departments of science from all parts of Germany. The work was commenced in September and brought to a close in December of the same year, and under the title of the 'Pharmacopœa Germanica,' by virtue of a resolution of the Federal Council of the Empire, passed in May, 1872, it took the place of the different pharmacopœias in use in the several states of the empire from the first day of November following. It will, therefore, be seen that from the very commencement of its history pharmacists played a very important part in the production of the first authoritative 'Pharmacopœa Germanica.'

But the interests of German pharmacists in the national pharmacopœia did not cease with its official recognition. Six years afterwards, the necessity for revision having become apparent, the German Pharmaceutical Association,—having then become the representative of the two separate associations for North and South Germany,—during its meeting at Coblentz, in 1878, nominated a Committee, of which Dr. Brunnengräber was chosen chairman, to consider suggestions for the improvement of the 'Pharmacopœa Germanica.' In the same year the Federal Council decided that a revised edition of the pharmacopœia should be published in 1882, or ten years after the publication of the original work, and that the task of preparing it should be entrusted to a Commission consisting of twelve physicians, six pharmacologists, six chemists, and six pharmacists, aided by two military doctors and a military pharmacist of superior rank, deputed by the Prussian War Office. About the same time the Imperial Chancellary sent out invitations to the different governments to obtain opinions from persons interested as to deficiencies that had become manifest during the use of the work, and after some negotiations a report drawn up by the Committee appointed by the Pharmaceutical Association was, at the request of the Government, placed at the disposal of the Imperial Sanitary Department. It is the result of the labours of the Commission thus appointed and assisted that has been recently issued under the title of 'Pharmacopœa Germanica: Editio Altera,' and which is to come into force, by Imperial decree, as the official *Arzneibuch* in the German Empire from the first day of January next.

(*To be continued.*)

A NEW METHOD OF MANUFACTURING SODIUM SULPHIDE.*

BY W. WELDON.

The question of how to manufacture sodium sulphide has occupied the attention of industrial chemists from almost the dawn of what we now understand by industrial chemistry down to our own time. Till recently, the object with which this question was studied was that of modifying the Leblanc soda-process in such wise as to avoid the production of the very undesirable residue of that process, and at the same time to permit of the sulphur of the sulphuric acid used in that process being perpetually recovered for use again. All attempts, however, so to modify the Leblanc process that sodium sulphide shall be its intermediate product, instead of "black-ash," have been unsuccessful; and although for nearly a century every successive failure to do that was followed, after a short interval, by fresh efforts to the same end, it is probable that the idea of converting sodium chloride into sodium carbonate by way of the intermediate production of sodium sulphide has now at last been definitively abandoned. On the one hand, the success of what is known as the "ammonia process," and, on the other hand, the probable realization of new methods of dealing with the residue of the Leblanc process for the recovery of sulphur therefrom, together with the discovery, made by myself some years ago, of the unexpected fact that sodium sulphide, pure enough to yield by treatment with CO_2 sodium carbonate uncontaminated with free sulphur, is absolutely infusible by any method which can be applied industrially, would seem to render all further attempts to realize a sodium sulphide soda-process quite out of the question.

Meanwhile, a demand has arisen for sodium sulphide as a substantive product. There is a demand for it for use in connection with tanning, for use in connection with bleaching jute, for use in the manufacture of pigments consisting in part of sulphide of zinc, and for various other purposes; and this demand has led to the realization of the method of producing it industrially by the wet way which I will now proceed to describe. The method in question is due to Mr. Helbig, of the great chemical works of Aussig, in Bohemia, the co-inventor with Dr. Schaffner of the method of recovering sulphur from alkali-waste. It is already in industrial operation at Aussig, and will shortly be in industrial operation in this country also, at the works of Messrs. J. C. Gamble and Son, at St. Helens.

When the residual product of the Leblanc process, known as "alkali-waste," is digested with water under a pressure of about five atmospheres, reaction takes place between some of the water and the greater portion of the calcium sulphide of the alkali-waste, in accordance with the equation:—

$$2\,CaS + 2\,H_2O = CaH_2O_2 + CaH_2S_2.$$

There is thus obtained a solution of calcium sulphydrate, capable of reacting on sodium sulphate, to give calcium sulphate and sodium sulphydrate:—

$$CaH_2S_2 + Na_2SO_4 = CaSO_4 + 2\,NaHS.$$

Up to this point I managed to get myself, some years ago, in some experiments conducted at Mr. Brock's works at Widnes; but I could not see how to get any further. That is to say, having obtained a solution of sodium sulphydrate by heating with water under pressure a mixture of alkali-waste and sodium sulphate, I did not see how to convert the sodium sulphydrate into sodium sulphide. The reaction so constantly in use in laboratories,

$$NaHS + NaHO = H_2O + Na_2S,$$

was of course obvious enough; but I could not see how to apply it except by using previously manufactured caustic soda, and to use previously manufactured caustic soda as a raw material for the production of sodium sulphide for industrial applications was, of course, out of the question. Mr. Helbig, however, does use caustic soda to react upon his sodium sulphydrate: but he does not use previously manufactured caustic soda. He obtains what he calls "a passing formation" of caustic soda in what seems to me a very ingenious and elegant and at the same time a very simple way.

Crude Leblanc soda, or "black-ash," as it is called in this country, consists essentially of a mixture of sodium carbonate and calcium sulphide. We have seen that calcium sulphide, when heated with water under pressure, gives two products, one of which is calcium hydrate; and we know that calcium hydrate can react on sodium carbonate to form calcium carbonate and caustic soda. Mr. Helbig takes advantage of this last mentioned fact by adding a certain quantity of black-ash to the mixture of sodium sulphate and alkali-waste which he digests with water. The reactions which then take place no doubt take place practically simultaneously, but they may be most readily explained by supposing them to take place successively: by supposing, that is to say, that water and calcium sulphide first react on each other, producing calcium hydrate and sulphydrate, that the

* From the *Journal of the Society of Chemical Industry*, November 29, 1882.

calcium sulphide so produced then reacts on sodium sulphate, giving calcium sulphate and sodium sulphydrate, that the calcium hydrate, which is one of the products of the first reaction, then reacts on the sodium carbonate of the black-ash, producing calcium carbonate and caustic soda, and that the caustic soda so produced and the sodium sulphydrate previously formed then react on each other and are both converted into sodium sulphide. The sum of these reactions may be represented by the equation:—

$$2CaS + Na_2SO_4 + Na_2CO_3 = CaCO_3 + CaSO_4 + 2Na_2S.$$

The operation is performed in iron digesters furnished with mechanical agitators—which are kept in motion throughout the operation—and heated by injection of steam. What is drawn off from the digesters when the operation in them is complete is a solution of sodium sulphide holding in suspension various solid matters. These having been separated by filtration, the solution is evaporated till its density has become about 32° Beaumé. During this evaporation any salts other than Na_2S which may have been originally present fall and are fished out. The concentrated solution is then allowed to cool, when it gives crystals of the hydrated salt, $Na_2S,9H_2O$.

Just two points more require to be mentioned. It is obvious that in the process just described the sodium sulphate might be replaced by sodium carbonate—in other words by more black-ash. The reactions in that case would all be the same as those I have enumerated, except that the sodium sulphydrate would be formed by the reaction of sodium carbonate upon calcium sulphydrate. As the value of sodium carbonate in the state of black-ash is not very much greater than that of sodium sulphate, Mr. Helbig at present prefers that all the sodium used in the process should go into it as carbonate; so that he now really uses, not a mixture of sodium sulphate, black-ash, and alkali-waste, but a mixture of black-ash and alkali-waste only. The reason for this preference is that a much lower pressure suffices to bring about the required reactions when using the latter mixture than when using the former.

The other point is curious. Just as the text-books say that sodium sulphide is a readily fusible body, so they say that crystallized sodium sulphide readily absorbs oxygen on exposure to the air; and just as I have found that pure sodium sulphide cannot be fused at all, on the large scale, in closed vessels made of a material on which Na_2S has no chemical action, so Mr. Helbig has found that crystallized sodium sulphide, as produced by his method, absorbs oxygen on exposure to the air only very slowly indeed. The difference between its behaviour in this respect and that of sodium sulphide made in other ways Mr. Helbig attributes to the latter always containing small quantities of caustic soda, whereas his crystals are quite free from caustic soda.

ATOMS AND MOLECULES.*

BY BARNARD S. PROCTOR.

The most important function of the President of a Chemical Society is to stimulate the chemical activity of the members by an action parallel to catalysis.

By his own molecular activity he should bring into play the affinities which are capable of developing new matter, without himself entering into combination with other molecules, in such a way as to deprive them of their individuality.

This function of your leading officer is much more easily exercised when his habitual work is intimately associated, either practically or theoretically, with the daily occupations of the members in general.

Unfortunately this is less the case with me than with any of the gentlemen who have filled this office before me. On this account I shall have to claim a large share of your indulgence and assistance.

Looking back a year, our society has lost two of its most eminent members, one distinguished for his extensive acquaintance with the chemical resources of the district, and the readiness with which he became the exponent and historian of its technology. The other, pursuing the paths of pure science, occupied a position of vantage not practically within the reach of technical chemists. A position which enabled him to meet each of us as an equal on our own ground.

It will be impossible for me to interest you as the former would have done by reviewing the technical changes of the past, and the prospects of the future for chemical manufacturers, or to trace the development of chemical laws, and recount the discoveries of recent years as would have been an easy task to the latter; but as every man's experience, and every man's train of thought has necessarily something of individuality to distinguish it from that of his fellows, and as each may profit to some extent by noting the facts or the fancies of his fellows, I will endeavour to lead you as it were on a holiday excursion, away from the technical department of our studies, where everything turns on the pivot of cost, and away from the purely scientific side, where all is excluded but experimental investigation and mathematical law.

I desire for the present to get beyond the walls of the shop, and the boundaries of the college. I desire to feel the freedom in which the schoolboy rejoices who has escaped from the customary restraint. I wish to be at liberty to say things which may be fanciful or imaginative, but I trust not foolish. Fancy has its duties in philosophy, though not in science. Fancy developes a multitude of half-truths, which by the treatment of science are decomposed, evolving an atom of truth and eliminating an atom of error; so truth is established, which would have lain dormant had not fancy thrown down the gauntlet to science. Our speculations are evolved by the philosophical use of the imagination, from the unsystematized truths which may be regarded as the waste material of science. Professor Mills says:—"The roadway on which chemistry now runs has been elevated by the rubbish of at least two thousand years."* It is my ambition now to scrape together a little heap of such rubbish.

It seems to be the natural desire of a chemist to see with his mind's eye the atoms and molecules, which can no more be seen through the microscope than by the unaided eye. While endeavouring thus to see the constitution of matter, we are told on the one hand that we may relieve ourselves from the idea of matter altogether, and be content with resolving all things into force;† and on the other hand we are told that force, in all its many manifestations, may be resolved into matter and motion. We are told at one time that force cannot act at a distance, that attractions are all resolvable into the effects of impacts of molecules in motion; and at another we are told that the molecules of solid bodies do not touch one another, the space occupied by the actual matter being small compared with the space separating the atoms from one another. We are told that attraction, as hitherto understood, is irrational because it is inconceivable. It is pointed to as an absurdity that force should throw out its boat-hooks, and draw two masses of matter together. To my mind the conception of a repelling force is just as difficult as an attracting, and I am compelled to admit that, where both are inconceivable, there is not much to determine us in rejecting one if we cannot equally do without the other. But we may dismiss them both, repulsion most simply by supposing it to result from the rebounding of atoms in collision; and we get rid of the idea of

* Presidential Address delivered before the Newcastle-upon-Tyne Chemical Society.

* *Phil. Mag.*, January, 1876.

† *E.g.*, Sir W. G. Armstrong, British Association Address, 1863, etc.

attraction by a speculation just one step more complicated, in supposing it to be caused by the collisions of atoms preponderating in one direction, the attracting bodies shielding one another on one side, and so being forced together by the impact of atoms on the opposite sides; but for these speculations to be entertained, we have to assume that atoms can pass through masses with nearly perfect freedom, which does not accord with our usual ideas of matter. To help us in our craving for an explanation of everything, the existence of a luminiferous ether is assumed, and it is endowed with hypothetical properties to suit every difficulty. It is assigned a position intermediate between matter and force. It is supposed to fill all space, and penetrate all bodies. It is supposed to be the basis, the physical basis perhaps we might say, of heat, light, electricity, magnetism, etc. Its movements are supposed to be the cause of polarity and induction. Perhaps they *are*, if the ether has any existence. On the present occasion, as I have stipulated for a full play of the imagination, we will assume the existence of the ether, the existence of matter, of atoms, of molecules, of spaces between them, of repulsions, attractions, polarities, molecular movements, and whatever else the exigencies of the moment demand.

The middle-aged chemist of the present day was taught in his youth that the general properties of matter included ponderability, size, shape, etc. That matter was distinguished from immaterial forces by its ponderability, the forces being spoken of as imponderable agents, though the expressions were often used somewhat indefinitely.

Gmelin ('Handbook,' page 2) speaks of the imponderables as *bodies*. Miller, without making the statement in so many words, evidently assumes that "bodies" or matter must be possessed of weight. ('Elements of Chemistry,' 1865.) In looking over these and other books which I reverenced as unquestionable authorities, quarter of a century ago, I feel tempted to put marginal queries to many paragraphs which point to questionable conclusions.

I propose to take as my starting point two or three of these marked passages—passages which will probably retain their position and authority for many years to come, but which, nevertheless, do not harmonize with more recent experience or modes of thought.

Turning to Miller's 'Elements' (vol. i., page 65), the phenomena of solution are explained as the result of the adhesion of the solvent to the solved, overcoming the cohesion of the latter. This can scarcely be regarded as an explanation, but even if viewed simply as a statement it is far from being satisfactory. If we accept the common meaning of the word adhesion, that is "sticking to," it can scarcely be admitted that a liquid sticking to a solid explains its disintegration. Nor is it much more satisfactory as an explanation, though it may be more correct as a statement, to say that the force which commonly manifests itself as cohesion is overcome by another force which commonly manifests itself as adhesion. Cohesion and adhesion may fairly be regarded as effects or manifestations of some form of force, but in a critical inquiry it is necessary to avoid confusion between a force itself and the phenomena by which that force is made manifest. It is scarcely a philosophical statement to say that a powdered substance dissolves more quickly "from the partial destruction of cohesion." Nor can we very readily admit that there is less adhesion between a crystal of sugar and a saturated syrup than between the same crystal and water, how then can we say that solution of the crystal takes place in consequence of the force of adhesion between it and the water in which it is immersed, and that the crystal remains unacted on by the syrup from the absence of adhesion between a material and its saturated solution?

When a supersaturated solution deposits a crystal, the cohesion is said to overcome the adhesion acting between the solvent and the substance of the crystal, but it can scarcely be admitted that cohesion proper comes into existence till the separation has taken place, though it might be correct to say that the *force which causes cohesion* has caused the separation of the solid from its solvent.

This would naturally lead to the question—"What is the nature of the force which causes cohesion?"

Gmelin ('Handbook,' i., 38) says, "If the insolubility of crystallized alumina arose from its cohesion being greater than its affinity for the acid, it ought not to dissolve in the acid after being ignited with potash, but to separate in consequence of its greater cohesion after the potash has been dissolved in the acid." In such a case as this I should say the cohesion of alumina no longer existed. It had been destroyed by the potash; not that any matter nor any force had been destroyed, but that one effect of a force had been destroyed by the diversion of the force to the production of another effect.

We may suppose the crystalline cohesion of the alumina was the effect of a polarity of its molecules which determined their set in the regular crystalline form; a polarity which is not destroyed by fusion with potash, or by union with acids, but which is satisfied or temporarily neutralized by any of these conditions. The polarity which causes crystallization at one time effects union with acids at another. A confusion arises through regarding cohesion as a force, rather than the effect of a force. Probably cohesion and adhesion differ only in name, the force being the same. We call it cohesion when it causes two molecules of the same nature to join, and adhesion when the effect is the joining of two molecules of different natures. Let us assume that molecules are endowed with polarities, which are the cause of crystallization, cohesion, adhesion, solution, etc.,—polarities which, like magnetism, are satisfied by meeting with equal and opposite polarities. Let us assume that molecules may have several axes of polarity which may differ much or little in intensity; we may speculate that viscosity is caused by a *multipolar* attraction of approximately equal intensities in different axes, and of a strength intermediate between those existing in solid and liquid states. We may suppose that mobility is the result of equality and feebleness of multipolar attractions; that the colloid state is consequent on equality with strength of multipolar force; that a crystalloid has strong and unequal polar forces which determine the arrangement of the molecules in the lines of their strongest polarities. We may suppose, when sulphate of soda or any other salt dissolves in water, that the polarity of its molecules is satisfied by the attraction of so much water as is required to make a saturated solution; and this polarity being satisfied, further water is miscible with it in all proportions. The greater solubility at higher temperatures probably arises from a weakening of the polarities as the effect of heat, an effect which is evident to us in the case of magnetism in iron. The stronger polarities probably diminish in greater degree than the weaker till fusion takes place, when the forces are approximately equal in all directions, and further diminish as temperature rises, till volatilization is effected, when molecular attraction seems to vanish altogether. This all appears reasonable enough in the case of sulphate of soda and water where the proportion between the salt and the solvent is such that we may suppose the molecules engaged on the phenomena are within the sphere of probable attraction; but when we come to such salts as chloride of silver, sulphate of baryta, etc., how can we suppose that one molecule of the salt can come within the sphere of attraction of so many molecules of water as are required for its solution? This has appeared to me a difficulty in all the theories of solution commonly propounded. If 100 molecules of water by their adhesion cannot overcome the cohesion of 2 molecules of sulphate of baryta, how is it likely that 1000 or 10,000 can attack the particle at the same moment?

How can we conceive of 1 molecule of chloride of silver being maintained in solution by its adhesion to 100,000 molecules of water? And the adhesion of 50,000

molecules of water is insufficient to restrain it from union with some other molecule of chloride of silver which may be adhering to 50,000 contiguous molecules of water?

Hydrogen dissolves in 50 volumes of water, or by weight, 1 in 12,500, or by atoms, 1 in 1400; probably this is much the same as saying that the molecules find freer space for their movements between the molecules of fluid water, than between those of the atmosphere of gaseous hydrogen from which the solution is taking place. The active movements in the hydrogen atmosphere tend to throw out molecules into any space freer than the atmosphere, and will so throw hydrogen into the water till the water is as crowded with hydrogen molecules as the hydrogen atmosphere itself, and then it is probable that interchanges will take place, but the number of molecules thrown into the water will be just equal to those thrown back from the water into the hydrogen atmosphere, and so there will be maintained a definite relationship between the proportion of hydrogen "absorbed" or "dissolved" by the water, and the temperature and pressure of the hydrogen atmosphere in contact with it. This doctrine is so nearly the common one in reference to gas and water that my statement is like an oft-told tale. But if we apply the same idea to the solution of chloride of silver it affords us at least some material for thought and speculation. The quantity of chloride of silver in its saturated solution in water is less than the quantity of air in an equal space of an ordinary air-pump vacuum, but more than in the high vacua used for radiometers or Swan lamps.

A cubic inch of air, attenuated to the thousandth of an atmosphere contains $\frac{3}{10000}$ of a grain of N and O. A cubic inch of saturated solution of chloride of silver contains about $\frac{2}{10000}$ of a grain of Ag Cl. But the highest authorities tell us that even in the most perfect vacua attainable, the molecules are crowded almost inconceivably closely together and in numbers quite beyond our powers of thought. The limit of solubility seems more probably determined by the relation of the molecular motions of the Ag Cl to this state of crowding than to any adhesion between the salt and its solvent, using the word adhesion in its customary sense. The flight of molecules of Ag Cl through the water would give them mean free paths of appreciable length before coming into contact with others, or within influence of their polarities and movements.

The movements of the Ag Cl in relation to those of the water may be compared to the movements of a comet in relation to a planetary system. The comet comes in and obeys the central commanding force and is temporarily part of the system, but is whirled away again into space, so the mass Ag Cl, by a temporary influence of the water, throws off an atom which, passing through a cometic orbit, having too distant a harmony with the aqueous sun to be retained in its system, passes into the aqueous space till it comes under the influence of a molecule or a mass of its own nature, with which it unites and passes out of solution.

The effect of heat is no doubt to weaken the molecular polarities, thus facilitating the disintegration of solids, but at the same time weakening the polar attraction between the solid and the solvent. The increased or decreased solubility with a rise of temperature will depend upon whether the polar attractions among the molecules of the solid diminish more or less rapidly, in proportion to the increased temperature, than the polar attractions between the solid and the solvent. Of course we expect the molecular movements of one drop of water to be just the same as of another, and we know they unite instantly and perfectly. The molecular construction of oil of turpentine or other essential oil we believe to be very different, and probably their molecular movements are inharmonious with those of water, resulting in the small degree of solubility between them, while the complicated and heavy molecules of the volatile oils having sluggish movement dissolve freely among one another.

To be continued.)

COTTON SEED OIL: SOME OF ITS USES IN PHARMACY, AND ITS DETECTION WHEN MIXED WITH OLIVE OIL.*

BY S. S. BRADFORD, PH.G.

Having had occasion during the last six years to manufacture lead plaster in considerable quantities, it occurred to me that cotton seed oil might be used instead of olive oil, at less expense, and with as good results. The making of this plaster with cotton seed oil has been questioned, as according to some authorities the product is not of good consistence, and is apt to be soft, sticky, and dark coloured, but in my experience such is not the case. If the U. S. P. process is followed in making this plaster, substituting for the olive oil cotton seed oil, and instead of ½ pint of boiling water 1½ pint are added, the product obtained will be equally as good as that from olive oil. My results with this oil in making lead plaster led me to try it in making the different liniments of the Pharmacopœia, with the following results:—

Linimentum Ammoniæ.—This liniment, made with cotton seed oil, is of much better consistency than when made with olive oil. It is not so thick, will pour easily out of the bottle, and if the ammonia used is of proper strength will make a perfect liniment.

Linimentum Calcis.—Cottonseed oil is not at all adapted to making this liniment. It does not readily saponify, separates quickly, and it is almost impossible to unite when separated.

Linimentum Camphoræ.—Cotton seed oil is far superior to olive oil in making this liniment, it being a much better solvent of camphor. It has not that disagreeable odour so commonly found in the liniment.

Linimentum Chloroformi.—Cotton seed oil being very soluble in chloroform, the liniment made with it leaves nothing to be desired.

Linimentum Plumbi Subacetatis.—When liq. plumbi subacet. is mixed with cotton seed oil and allowed to stand for some time the oil assumes a reddish colour similar to that of freshly-made tincture of myrrh. When the liquor is mixed with olive oil, if the oil be pure no such change takes place. Noticing this change, it occurred to me that this would be a simple and easy way to detect cotton seed oil when mixed with olive oil. This change usually takes place after standing from twelve to twenty-four hours. It is easily detected in mixtures containing 5 per cent. or even less of the oil, and I am convinced, after making numerous experiments with different oils, that it is peculiar to cotton seed oil.

CATTLE CONDIMENT.

"In the preparation of cattle food the main object is to make the food palatable. The animal is more contented, it eats with a contented relish, and a greater thriftiness is the result. I am not a believer in the condimental value of these foods, for I believe that in our grasses we have all the condimental elements required. But should my correspondent desire to make his own cattle food, here is a common formula:—Locust bean, 6 cwts.; Indian corn, 9 cwts.; best linseed cake, 3 cwts.; powdered turmeric, 40 lbs.; sulphur, 40 lbs.; saltpetre, 20 lbs.; liquorice, 27 lbs.; ginger, 3 lbs.; aniseed, 4 lbs.; coriander, 10 lbs.; gentian, 10 lbs.; cream of tartar, 2 lbs.; carbonate of soda, 6 lbs.; levigated antimony, 6 lbs.; common salt, 30 lbs.; Peruvian bark, 14 lbs.; fenugreek, 22 lbs. This will make as good a cattle spice or food as any that can be bought. But my own opinion is that food can be made very palatable by simply mixing with it a small proportion of locust bean meal and a little salt; and locust bean meal can be purchased at about £8 10*s.* a ton just now, so that it is not very expensive."—*Correspondent of the Morning Post.*

* From the *American Journal of Pharmacy*, October, 1882.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 16, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE JUBILEE OF M. DUMAS.

THE French Academy of Sciences was last week the scene of a graceful and well-deserved compliment to one of the ablest of living chemists, in the presentation to M. DUMAS of a medal which had been struck specially to commemorate the fiftieth anniversary of his election as one of its members. Science is too cosmopolitan to limit the faculty of admiration for such a career as that of M. DUMAS to one country, and therefore, notwithstanding his countryman's arrogant boast that chemistry is a French science, there is not an English chemist who would grudge to join in according to the veteran scientist a full meed of honour, in the same catholic spirit as permeated his own panegyric a few years ago of our great countryman, FARADAY. But beyond a share in this general sympathy, the readers of this Journal may claim to have a special interest in M. DUMAS, arising from the fact that he is one of the band of famous men who began their scientific career in the pharmacy.

Born in the year 1800, M. DUMAS, shortly after the battle of Waterloo was fought, became an apprentice to a pharmacist in his native town of Alais, in the department of the Gard. Not satisfied, however, with his prospects there, he in 1816 travelled on foot to Geneva, where he attended lectures on botany by the elder DE CANDOLLE, on physics by PICTET, and on chemistry by DE LA RIVE. He, moreover, had the good fortune to secure there the superintendence of a large laboratory, which had previously been used for courses of practical chemistry, but then belonged to the pharmacy of M. LE ROYER. We learn from the eloquent biography from the pen of Dr. HOFMANN, which, about three years since, was published in *Nature*, that his fellow pharmaceutical students, who frequently united in botanical excursions during the summer, started the idea of winter meetings for scientific studies, and it was proposed that as young DUMAS had a laboratory at his disposal he should give them a course of experimental chemistry. Much patience and ingenuity were required before the apparatus absolutely necessary was constructed; but all difficulties were overcome, and thus early he made his *début* in the professorial career, which he afterwards followed with so much success in Paris at the Athenæum, the Polytechnic School, the Sorbonne, the School of Medicine and the College of France. It was, however, in connection with work strictly pharmaceutical that the name of DUMAS first appeared in scientific literature, and mention of the subject will assist in conveying some idea—though still a very vague one—of the enormous strides that have been made in scientific pharmacy since that time. DUMAS was eighteen years of age when he detected the presence of iodine in carbonized sponge, and in consequence Dr. COINDET, at whose request the examination had been made, announced iodine as a specific against goitre. This led to further inquiries as to the most convenient mode of administration, and DUMAS suggested the trial of a tincture of iodine, potassium iodide and iodized potassium iodide. But only about six years had elapsed since COURTOIS had first separated iodine from the waste liquor in the manufacture of soda ash from seaweed, and still more recently had it been recognized as an elementary body by GAY-LUSSAC; the iodides were then unknown to trade, and iodine was the only commercial article available. The discovery of Dr. COINDET, however, originated a great demand for iodine preparations, and for many years their manufacture proved a source of wealth and reputation to the pharmacy of LE ROYER. After this, DUMAS' association with pharmacy was not so close, although nearly fifty years subsequently he presided over the Commission entrusted with the revision of the French pharmacopœia. But he now joined PREVOST in those physiological investigations which for a time diverted his attention from more purely chemical studies, though they brought to him a reputation that eventually led to his migration to Paris, where chemistry again resumed its sway.

We must be content with having thus briefly sketched DUMAS' early work whilst engaged in a pharmacy; it would be impossible in these columns even to mention his multitudinous subsequent investigations. In the words of the President of the Academy, M. JAMIN, he went to Paris with no other wealth than a brave heart, a resolutely fixed programme, the will to carry it out, and confidence in himself, but still unconscious of the future that awaited him. To-day, with the progress of time, his dreams have been realized, his hopes surpassed, and he has attained the highest pinnacle of honour that a scientific man can hope to attain. Like FRANKLIN, he might say, "If I had to recommence life, I could not ask for more!" Looking back upon the brilliant services to science which M. DUMAS has rendered since he first took his seat in the Academy half a century ago, it is not difficult to understand the feeling which impelled M. JAMIN, who had himself sat under the famous teacher he addressed, to say: "The pupil cannot "assume, without irreverence, the right to praise or "to criticize; face to face with his master, he has "only the duty of respect."

DEFECTIVE WEIGHTS AND MEASURES.

We regret that circumstances appear to us to make it desirable that we should once more direct the attention of chemists and druggists to the imperative necessity, if they wish to avoid annoyance and loss, that they should satisfy themselves as to the weights and measures used by them coming within the requirements of the law, and that they should exercise care in the purchase of new ones. But we think that a sufficient justification will be found in a statement of the results of a week's inspection in one of our cities, which has been placed at our disposal by a correspondent whose good faith and capability of forming a correct judgment are beyond challenge. The shops visited were twenty-four in number; in only four instances were all the weights and measures found correct, and in sixteen cases summonses were issued and convictions followed. Altogether 1207 weights and 127 measures were examined. Of the weights 128 were found too light, 97 were too heavy, and 59 were illegal only in being unstamped. Of the measures 31 were found incorrect. There were also 54 scales tested and 17 proved untrue. The nature and extent of the default may be seen from the following table, setting out the amount of error in the weights seized in two cases in which convictions were obtained:—

First Case.		*Second Case.*	
Denomination of Weight.	Error.	Denomination of Weight.	Error.
6 grains .	. $\frac{9}{10}$ gr. light.	6 grains .	. $\frac{9}{10}$ gr. light.
5 grains .	. $\frac{2}{10}$ gr. light.	5 grains .	. $\frac{4}{10}$ gr. light.
4 grains .	. 1 gr. light.	4 grains .	. $\frac{4}{10}$ gr. light.
2 drachms	. $1\frac{1}{2}$ gr. heavy.	3 grains .	. $\frac{7}{10}$ gr. light.
2 scruples .	. $\frac{3}{10}$ gr. heavy.	1 grain .	. $\frac{3}{10}$ gr. light.
1 scruple .	. $\frac{3}{10}$ gr. heavy.	2 drachms	. $\frac{5}{10}$ gr. heavy.
$\frac{1}{2}$ scruple .	. $\frac{6}{10}$ gr. heavy.	1 drachm .	. $\frac{4}{10}$ gr. heavy.
		$\frac{1}{2}$ drachm .	. $\frac{5}{10}$ gr. light.
		1 scruple .	. $\frac{6}{10}$ gr. heavy.
		$\frac{1}{2}$ scruple .	. $\frac{3}{10}$ gr. heavy.

THE PARIS SCHOOL OF PHARMACY.

It may interest some of our readers to learn that an excellent full page engraving of the new buildings of the Ecole Supérieure de Pharmacie, which have recently been erected in Paris at the expense of the French nation, was published in *The Builder* for November 25. The view is taken from the rear of the buildings, near the junction of the Rue Michelet and the Rue d'Assas, and consequently it does not show the principal façade in the Avenue de l'Observatoire; but this is more than compensated for by the greater extent to which the details of the different buildings are disclosed. Looking across the ample botanical garden, with its hot house accommodation, the eye rests on two handsome horseshoe shaped buildings, each containing an amphitheatre capable of accommodating an audience of six hundred persons. These lecture theatres are connected by vestibules and galleries with the main building, portions of the back of which are seen, and in which are situated the examination hall, the residences of the officials, the professors' laboratories, the museums, reading rooms, library, etc. On the left hand of the picture, running back from these, and with an outlook towards the north over the Rue l'Abbé de l'Epée, is a long three-storied wing, devoted to practical work, the ground floor containing the chemical laboratories for the first year's students, the second floor those for the second year's students, whilst in the upper floor micrographic work is carried on by the more advanced pupils.

PHARMACEUTICAL INSTRUCTION IN DUBLIN UNIVERSITY.

It may be useful to some of our readers to learn that in the Experimental Science School, Trinity College, University of Dublin, there are now courses of instruction, specially arranged for pharmaceutical students to meet the requirements of the Pharmaceutical Society of Ireland, which may be attended by persons otherwise unconnected with the College. The lectures are delivered twice a week, Tuesdays and Thursdays, the course extending from November 1st to March 31st, and on an additional day in each week illustrative experiments are conducted in the Laboratory. The necessary three months' practical course in the Laboratory may be commenced on the 1st of January or the 1st of April, and is under the joint supervision of the University Professor of Chemistry (Professor J. Emerson Reynolds), and the King's Professor of Materia Medica (Dr. W. G. Smith). It comprises instruction in the qualitative testing and volumetric analyses of the Pharmacopœia and in the examination of drugs for pharmaceutical purposes. Pharmaceutical students are also allowed to attend the summer course of lectures delivered in the Medical School by the Professor of Materia Medica and Pharmacy.

DEATH OF MR. S. U. JONES.

Our readers will read with regret the announcement made at the meeting of the Chemists and Druggists' Trade Association, on Wednesday evening, of the death of Mr. Samuel U. Jones, of Leamington, who took an active part in the formation of that society and was unanimously elected its first President. Mr. Jones was also an esteemed member of the Pharmaceutical Society, which he served during many years as Local Secretary.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association will be held on Wednesday next, December 20, at the new rooms, 53, Conduit Street, W., when a paper will be read on "Plant Names," by Mr. C. E. Stuart.

Mr. Robert Gibson, Pharmaceutical Chemist, of the Carlton Medicated Lozenge Works, Hulme, has been elected without opposition Alderman for St. George's Ward, Manchester.

Chemists and Druggists' Trade Association of Great Britain.

MEETING IN LONDON.

A general meeting of the members of the trade resident in London, convened by the Executive of the Chemists and Druggists' Trade Association, was held on Wednesday last, at the Inns of Court Hotel, for the purpose of considering what amendments are desirable in the Pharmacy Act, 1868, the desirability of holding periodical meetings, and to discuss matters generally of trade interest. Mr. Robert Hampson, President of the Trade Association, occupied the chair.

The Chairman, after expressing regret for the absence of Mr. Urwick, who had gone to Leamington to attend the funeral of Mr. Jones, the first President of the Association, said the London Committee of the trade had for some time thought that it would be a good thing to have a meeting of the members of the Association to take into consideration trade questions, and the result was that the members had been asked to attend that evening. There was no organization, except the Pharmaceutical Society, in London, which could call the members of the trade together, and it seemed to be a fit thing that they should meet occasionally to discuss trade matters. London was so vast that it was almost impossible to get that spirit of union which places such as Manchester and the like found it possible to do. Unless there was some burning or political question, it was very difficult to get many members together in London; but he hoped that in course of time chemists would find it to their interest to meet as other bodies of men would when anything of importance was in possession of their minds, and that they would meet to discuss their own interests, and that larger meetings would be assembled than they had that evening. There was one special subject mentioned upon the agenda which made it almost imperative that the chemists of the metropolis should meet together, and that was the prospect—it might be a remote prospect, though he was disposed to think it was not quite remote—of having an amended Pharmacy Bill. But that question was ripening. Some time ago a Draft Bill was sent to the Government Office for consideration, but no social or home legislation had lately had any chance whatever, though it was to be hoped now that Parliament had consented to organize itself as it were as a body capable of doing political work, that it would be able to enter upon a period of practical legislation, and that the question of pharmacy would receive proper attention at its hands. If chemists and druggists went before Parliament for a Bill, it was essential that they should know what they wanted, and that they should agree upon certain main points which they thought it desirable to have in the Bill. It was most essential that they should not indulge in Utopian proposals or vague grumblings, but they should be prepared with a Bill suited to public wants as well as their own wants. He was quite sure that it would be of no use asking for anything that was incompatible with the public interest. Their interest after all was the public interest; they had no right to special legislation except in the public interest; but he was firmly convinced that the legislation they already had, or which the State had inflicted upon them, had been of public benefit, and that if they proceeded upon the lines of qualification and education they would obtain what they required. The first thing to be done in any new Bill was to repair the great breach which had lately been made at Westminster, and by that expression he referred, of course, to the decision of the House of Lords. It was no use giving them any Bill without that breach was repaired. It was possible that the decision of the House of Lords was technically right and that the framers of the Pharmacy Act might not have contemplated limited liability companies carrying on the business of chemists and druggists. The law might be good, but certainly no justice had been obtained at Westminster. The decision was contrary to the spirit of the old Act, and certainly no Bill would be acceptable to the chemists or compatible with public interests unless that breach was repaired. Was it an advantage to the public that pharmacy should receive the countenance of the State at all and was it desirable that chemists should be thoroughly qualified? Of course every one was agreed upon that. But then came the question whether it was desirable that pharmacy should receive any further recognition from the State. They would all agree that certain things required alteration, and they could only hope that when the time arrived they would at any rate amend the Bill in all the main points. He maintained that if pharmacy was not worth following, owing to the business being diminished and rendered worthless, the public would suffer along with the chemists. It was not simply their own loss, but the public loss and the loss which medical men must sustain. The interests of chemists were bound up with those of the medical faculty, and anything which injured them injured the medical profession, and therefore that profession ought to unite with the chemists in obtaining what was considered right. He also considered that an Englishman was quite as good as an Irishman, but by the provisions of the Irish Pharmacy Act, pharmaceutical chemists alone had the right of dispensing prescriptions. In all Colonial Bills there was a similar clause, and he maintained that an English pharmacist ought to have the same right. What were they educated for? Not simply to have attached to their names some useless title. What would a mariner think if, after receiving an excellent education in navigation and all that applied to the safe care of a vessel, he was never allowed to enter a ship and sail a voyage? The thing was utterly absurd. Take the case of a student in music; if he were constantly engaged in rehearsals and never allowed to sing in public his qualifications would be of no use at all. The education of a chemist was utterly useless unless he was able to exercise it in true pharmacy. They heard a good deal of talk about imposing a curriculum upon students, but it was all perfectly useless, unless they could make use of their sharpened qualities. There would be no lack of zeal in the students if they found during their apprenticeship that pharmacy was a thing really required; but of course students received a damper directly they found that dispensing was an unimportant and minor thing. He thoroughly agreed with the imposition of a curriculum, as it would bring about the establishment of educational centres. Then again, they must bear in mind that unless they had the pharmacy of the country and the sale of drugs in their hands, in consequence of the very quick vanishing of miscellaneous trade owing to the terrible competition which prevailed, there would be nothing left to them. They must stick to their proper calling, viz., pharmacy, and endeavour as much as possible to obtain a fair recognition of it. The next question for consideration was that of patent medicines containing poisons, and he hoped that in any future Bill there would be a provision that these medicines should only be sold by pharmacists. The wholesale patent medicine vendors ought not to utter any protest about this. At one time these gentlemen only sold to chemists, but now they did not care to whom they sold, though he thought that chemists being independent people might be able to take care of themselves in this matter. The most important thing after all, after knowing what they wanted, was to become thoroughly organized either by that Association or the Pharmaceutical Society, so that when the time came to urge upon the Legislature their claims, they might be able to carry through a Bill. If they did not know what they wanted, they would have no chance of carrying any Bill, but if they did know what they wanted, and their wants were reasonable and they were zealous in representing their views, he had no hesitation in saying that they would carry a satisfactory Bill.

Mr. Holmes moved the first resolution as follows:—

"As it is likely practical legislation will be possible in the next session of Parliament, this meeting expresses an earnest hope that a Bill may then be passed to amend the Pharmacy Act, 1868."

He thought everyone would rejoice in seeing that the Privy Council had at last requested the Pharmaceutical Society to send in a Draft Bill for an improved Pharmacy Act. After the remarks which had been made by the Chairman it was hardly necessary for him to state in what respects the Pharmacy Act required amendment, but his own opinion was that the sale of patent medicines require special attention. In the neighbourhood of Pimlico, where he resided, he suffered from competition not only from co-operative stores, but from oilmen and grocers, who sold patent medicines at the price which he (Mr. Holmes) had to pay for them to the wholesale house. There was no Act of Parliament to prevent chlorodyne or solution of chloral being sold by an uneducated person, and he thought that as a chemist was obliged to pass a certified examination before he could sell poisons, that the same law should apply to the sale of patent medicines. With regard to dispensing by co-operative stores, that was, in his opinion, a very iniquitous thing, because the Act of Parliament provided that no person could keep an open shop unless he was qualified by having passed the requisite examination, or was on the register. A chemist and druggist could not take into partnership any person not upon the register, therefore it followed that it was unlawful for certain persons to enter into partnership for the sale of patent medicines by merely employing a qualified assistant. If co-operative stores could be put upon the same basis as chemists and druggists an amendment might be made in the Pharmacy Act.

Mr. Woolings, in seconding the motion, said he thought that registered chemists and druggists, as well as pharmaceutical chemists, should be exempt from serving on juries.

Mr. Nicholls wished to be informed of the salient points upon which they desired to have some alteration in the Act.

The Chairman said the second resolution covered that ground.

The motion was then put and carried unanimously.

Mr. Long moved the second resolution as follows:—

"That whilst leaving with confidence to the Executive Committee of the Chemists and Druggists' Trade Association the consideration and careful watching of any Pharmacy Bill brought into Parliament, this meeting is of opinion that unless it contains the following or equivalent provisions it will not be consistent with the public safety nor adequate to the just claims of pharmacy and of legally qualified registered persons practising the same: (1) To insure that all persons, without any distinction whatsoever, keeping open shop for the dispensing of medicine and the sale and dispensing of poisons should be legally qualified and registered; (2). That patent medicines containing scheduled poisons should be sold only under the same or similar restrictions as are already applied to the sale of other poisons enumerated in the schedule of the Pharmacy Act."

As reference had been made to the decision given by the House of Lords with regard to what constituted qualification, he might perhaps be permitted to point out that the Act itself said that it was expedient for the safety of the public that all persons who sold medicines should be qualified. That was a proposition which no sane person would attempt to dispute, and he could not see that there was any difficulty about the subject at all. With all due deference to the decision of the House of Lords, it was not, to his mind, English law. There was no reason whatever why a corporate body should not be composed of qualified people. Of course, it would be perfectly impossible to have a dozen people up, unless they were going to catechise them as a class; but they could take each individual separately and examine him, and if he was not competent to pass the examination then he was not qualified to carry on business according to the Act, because the Act most decidedly gave a definite status and conferred certain rights and privileges on chemists and druggists, and it was not customary in England to abolish rights and privileges without compensating those who possessed those rights. The law did not say that the servant qualified the master; in everything legal, medical and pharmaceutical, it was necessary for the master to be qualified, and the sense of that was evident, as the directing mind ought to be able to know what was right and what was wrong. A manager might be a very good man, but unless he was able to direct and decide, the thing was perfectly futile. He did not think there would be any difficulty about the first proviso of the resolution. The Pharmaceutical Society had been established for more than forty years, and there was now no one in business who had not had the opportunity of joining, either by free admission or examination, and it was evident that a large amount of skilled technical knowledge was necessary to conduct the business of a chemist. Cutting out of the Pharmacopœia the common family requisites, such as carbonate of soda, arrowroot and essence of lemon, he thought that all drugs of curative or active properties should only be sold by the men who had qualified themselves to know their properties and could dispense them with safety to the public. The act of dispensing did not merely mean mixing together a doctor's prescriptions, but giving a certain amount of advice, and therefore their aim and object should be, the Pharmacopœia for the pharmacist. There was no difficulty in defining who should sell, and what they should sell. Pharmacists ought to be the only makers of patent medicines; he knew they were only the makers of respectable patent medicines; because the makers now were so anxious to procure a large sale that, like traitors in the camp, they did not care whether they sold to friends or enemies. It would not be at all difficult for chemists to keep their preparations to their own profession, and it would be better for them if they did. With regard to the powerful patent medicines the resolution was absolutely necessary, because it was perfect nonsense to expect a man to go through the education required of a pharmacist and then to allow an incompetent man to sell side by side with him the same articles.

Mr. Nicholls, in seconding the motion, said there was scarcely a patent medicine which did not contain poison, and therefore the sale of these articles should be relegated solely to pharmacists. He was sure nobody would be better pleased if this could be brought about than the medical faculty. As a matter of fact it was necessary to give a certain amount of advice upon the sale of any patent medicine, and it was not to be expected that a person in a grocer's shop could tell a customer as to how the medicine should be administered to a child. He was strongly of opinion that most of the homœopathic medicines were dangerous in the hands of shopkeepers, and that these medicines should be included in the category of patent medicines.

The Chairman pointed out that at the present time homœopathic medicines containing an appreciable amount of poison were within the Act, and it was illegal for an unregistered person to sell them.

Mr. Horncastle thought it was very important that chemists should be united before going to Parliament for any Bill, and such meetings as the present were likely to go a long way towards accomplishing that object. It had been suggested that chemists should take out a licence, but he thought they were sufficiently saddled at the present time. Pharmaceutical legislation hitherto had done a great deal for the public, much more for the public than the trade, and now the time had arrived when chemists might very well come forward and ask for something for themselves, but in doing so

they should try to draw a distinct line between chemists and druggists and the ordinary trade. He saw no difficulty in restricting the sale of compounds mentioned in the Pharmacopœia to chemists and druggists, though the case was entirely different as regards simples and trade chemicals. The sale of all patent medicines ought to be confined exclusively to them, and the only way to secure the interest of the public was the one which would secure the interest of the trade. Many could remember the time when the first Pharmacy Act was brought forward, and how it was mutilated and crippled by the division in the trade, and, therefore, he hoped there would be no personal bickerings when the next Bill was brought forward.

Mr. Wightman Cooper thought the last speaker had enunciated the feeling of pharmaceutical chemists, though he was not so sure that he had expressed the opinion of chemists and druggists. A glance at the poison schedule to the Bill of 1868 would show that the gentlemen who legislated for the trade at that time knew nothing about the matter, or if they did, they had sadly neglected their duties. They should have included some two hundred or three hundred things called drugs, and so have made it worth the while of many persons to pay attention to the trade. At the present time the schedule was so cramped that anyone was able to open shop, and to set the chemist at defiance. He was glad to think that there was a sensible feeling at last that chemists should combine for their mutual benefit, but he was afraid it was now too late. Free trade was very good in many things, but there could be no free trade in a restrictive business, and he was sorry that the leaders of pharmacy had made the mistake of restricting without giving sufficient compensation. Now if they had found out their mistake he hoped they would be able to rectify it.

Mr. Lawrence asked whether the views expressed at that meeting would be brought before the Pharmaceutical Society.

The Chairman said it was competent for the meeting to do so. The last speaker seemed to imagine a great mistake had been made because the earlier movers in pharmaceutical politics did not include drugs in the schedule, but the Privy Council would not accept such an enlarged schedule. To have done so would have been to destroy the use of the word "poison" altogether. As a pharmaceutical chemist he did not take any share of the blame which had been attached to that small body, and the meeting should remember that the chemists and druggists outnumbered the pharmaceutical chemists, and if they had chosen, when they had the opportunity, to join the Society they might have manipulated it as they wished. The folly entirely rested with them for not having taken advantage of their opportunity. Inasmuch as they did not join the Society the subject of legislation had been left in the hands of a small number who had done a great deal of good for the trade.

Mr. Cooper asked whether the meeting had been called by the Chemists and Druggists' Association of Birmingham, or by the Pharmaceutical Society.

The Chairman replied by the Chemists and Druggists' Association of Great Britain.

Mr. Cooper thought the motion did not go far enough, because it did not state sufficiently the alterations required. They had had many additions to the poison schedule, and certain tinkerings with the Pharmacy Act, and the time had now arrived for them to act, once for all, and to say that everything which came under the word "drug" should be included in the schedule. If that were done, the public would know what drugs were. As an amendment to the second provisio, he begged to move—

"That every article which could be enumerated as a drug should be included in the new Pharmacy Act, and sold only by chemists."

Mr. Henchley seconded the amendment.

Mr. Nicholls hoped that the amendment would be withdrawn, because if they went for too much they would not get anything.

Mr. Reid asked whether the motion which had been put forward could be amended or enlarged by the Committee, which would be afterwards appointed.

The Chairman said, Certainly. He might point out that application had been made to the Privy Council to add mineral acids to the schedule, and he did put it to the meeting, whether it was expedient to try and include all drugs in the schedule. To his mind it was not only inexpedient, but unwise, because he was sure that no Government would grant such a thing.

Mr. Allen thought that if they went to Parliament for anything unreasonable they would fail altogether, and therefore he hoped Mr. Cooper would not press his amendment.

Mr. Barnard was of opinion that it would be absurd to ask Parliament to give them an Act embodying everything which could be classed under the name of "Drugs."

Mr. Cooper said the time had now arrived when they should make a stand as to whether they should live or die, and therefore he could not withdraw his amendment.

The amendment upon being put to the meeting was lost by a large majority.

The motion was then put and carried.

Mr. Allen moved the next resolution as follows:—

"That it is advisable to hold periodical meetings of the members of the Association resident in London, and that the London Committee be requested to make the necessary arrangements for the same."

The reason for this resolution was that the London members did not possess the opportunity of meeting together to discuss trade questions in a purely commercial or trade manner. He was old enough to remember the agitation prior to 1868, when certain gentlemen were always ready to come forward to discuss questions relating to their business, and the result of their meeting was the establishment of the Pharmaceutical Society, which had done so much for the trade. There were many subjects which could be discussed at these meetings, for instance, the copying of prescriptions, for which chemists were not paid, the long hours of business, and the sale of patent medicine.

Mr. W. Cooper, in seconding the motion, said he thought it would be a great advantage to hold sectional meetings in London.

Mr. Andrews agreed that one meeting would not be sufficient for the whole of London, but if they commenced with one meeting, it would not be long before many district associations sprang up.

The motion was put and carried unanimously.

On the proposition of Mr. Long, a cordial vote of thanks was passed to Mr. Hampson for presiding, and the meeting separated.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of the Society was held on Wednesday, the 6th instant, in the College of Physicians, Kildare Street, Dublin. The President, Dr. Charles Tichborne, in the chair.

The other members of the Council present were the Vice-President, Dr. Aquilla Smith; Dr. Montgomery, Dr. Collins, Mr. Brunker, Mr. Allen, Mr. Hayes and Mr. Hodgson.

Mr. Hugh Fennell, the Registrar, read the minutes of the last meeting, which were confirmed.

A letter was read from Mr. John Patrick Henry, L.P.S.I., of Belfast, in which the writer complained of some remarks made in reference to him by Dr. Dill, Coroner of Belfast, at a recent inquest. Mr. Henry stated that in reference to the case to which the inquest

related he had done more than the law required, and yet the coroner said that he had "evidently looked on the matter as a business transaction and sold laudanum without caring whether the man poisoned himself or not." Mr. Henry referred to an editorial article which had appeared in the *Pharmaceutical Journal* of October 28, 1882, on the subject, and asked whether or not the Society would protect its licentiates from such language as that used by the coroner.

Dr. Montgomery moved that the letter be marked "read." There was nothing in it that they could take notice of.

The President said no doubt the coroner did make a slip and his law was not very good; but the subject had been already thoroughly ventilated in the newspapers and he did not see that the Society could do anything in the matter.

The motion of Dr. Montgomery was agreed to.

A letter was read from Mr. James H. Haslett, of Belfast, inquiring whether candidates who passed their Preliminary examination before November 1, 1882, would be exempt from the operation of the new rule passed on that day, which fixes the time to be spent in learning practical pharmacy at four years.

The President read the rule as follows:—"That all candidates for the licence shall be required to produce a certificate signed by a pharmaceutical chemist or apothecary keeping open shop, stating that he has served a *bonâ fide* engagement with him as either apprentice or assistant, in his sole employment, for a term of four years. To come into force on January 1, 1884."

Mr. Hodgson said that, according to that rule, before the writer of the letter could come up for his Major examination he certainly would have to serve four years. But the rule would not be law without the consent of the Privy Council; and any member of the Council of the Society going before the Privy Council and objecting to the rule could upset it. He was not clear that he himself would not do so, for he had the strongest objection to the rule. He believed it was contrary to the principle of the Pharmacy Act, and at variance with the opinion of their late lamented President, Sir Dominic Corrigan, who always objected to apprenticeship, and maintained that it was enough for a man to show by examination that he knew his business.

The President said the question of apprenticeship was not raised by the letter. The real point was as to time. The rule made it four years instead of two. He certainly thought the rule would prevent the writer from coming up for his Major examination on two years' study or service. But the only question now before them was, what reply was to be given to the letter.

Mr. Hayes said the application of the rule would be hard upon men who had passed their Preliminary examination under the old rule.

Mr. Allen said notice might be given of a motion to exempt from the operation of the rule those gentlemen who should pass the Preliminary examination before January of next year.

The President said the best course would be to inform Mr. Haslett that the new rule was under the consideration of the Privy Council.

The Registrar stated that on the previous Saturday he had received a letter from Dr. Kaye, Q.C., Clerk to the Privy Council, enclosing for the approval of the Council of the Society the rule in question amended as follows by the law officers of the Crown:—

> "That every candidate for the licence shall be required to produce a certificate, signed by a pharmaceutical chemist or apothecary keeping open shop, stating that such candidate has served a *bonâ fide* engagement as apprentice or assistant, with and in the sole employment of such pharmaceutical chemist or apothecary, or a firm of which he is a member, for a term of four years. To come into force on January 1, 1884."

The President said the last part of the amended rule would require consideration.

Mr. Hodgson said there were two hundred and eighty-seven young men, every one of whom had passed his Preliminary examination under the impression that when qualified by two years' practical pharmacy he would be able to pass the Major examination. If this rule, which had been adopted in a crude manner, should be enforced, it would be a breach of faith with them.

The President: I think there has been only an oversight that can be easily remedied.

Dr. Montgomery: The Council did not adopt the rule hastily. It was a long time under consideration. The only mistake was that they did not define the time more accurately.

The President: It will meet the case for us to reply to Mr. Haslett that the matter is under consideration, and no final decision has been arrived at.

A letter was received from Mr. J. B. Fisher, making inquiries as to certain legal proceedings.

The Registrar was directed to reply to Mr. Fisher, stating that as he was not a member of the Society, the Council could not continue to correspond with him on the subject.

A letter was received from Mr. Hatchell Whitby in reference to the conference of four members of the Council with four members of the Society, stating that it would be out of his power to undertake to arrange with any of the members of the proposed committee.

The letter was marked "read."

A report of the Law Committee, making a recommendation as to the course of action to be taken with reference to a letter from Mr. Daniel J. McGrath, L.P.S.I., of Carlow, as to the sale of poisons, was adopted.

The Council then adjourned.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting was held in the ante-room of the Town Hall, on December 1, when Mr. W. D. Savage read a paper entitled—

Some Thoughts suggested by Professor Attfield's Address to the British Pharmaceutical Conference at Southampton.

The many and important subjects alluded to in the admirable address of Professor Attfield, at the opening of the Conference at Southampton, may fairly claim from us some consideration, and as the subject has been suggested to me as an appropriate one for opening our local session, I readily avail myself of this opportunity of congratulating the Professor on his happy selection and systematic arrangement of subjects. Exhaustive research, careful manufacture, and thorough distribution, or the collection, preparation, and distribution of drugs, embrace a wide field for discussion, and although they have at his hands had great consideration, yet there are some points on which we may, some of us, differ, and it is well on such occasions as the present that we should freely discuss the various subjects brought before us, and ascertain thereby how far our views accord with those of the worthy Professor.

With respect to the first heading "Collection," it is suggested that flower culture, and medicinal plants might with advantage be more extensively cultivated in our own country, and if we might infer from the success which attends the culture of lavender and peppermint—at Mitcham, and other places—it would seem desirable, in the present depressed state of agriculture, that an experiment in this direction should be tried. Of course it would, in the first place, be necessary to know what conditions of soil are suitable; and what counties, in the second place, are best likely to fulfil those conditions; and

now that scientific farming is exciting considerable interest, and is in our own country being practically carried out by Professor Jamieson, of Aberdeen, the time seems appropriate for considering this important subject. It is true that our climate is not very favourable for the production of many plants yielding the finer perfumes, but still much might be done to meet climatic difficulties. Look for instance at the obstacles which the farmers in Kent have to encounter in the cultivation of hops, and whilst they have not lately been very successful, times have been when their care and expensive culture has been well rewarded. And under the head of "Collection" might not some of our indigenous plants be made more available that they are at present? Indeed, there does seem a tendency in this direction. We have in "The Month" of the October number of the *Pharmaceutical Journal*, reference to fool's parsley, burdock (*Arctium Lappa*), etc.; and if we go back to the time of John Gerarde, 1633, we there find, in his 'General History of Plants,' a valuable collection of remedies; and again, in 1653, our old friend Dr. Culpepper,—in his 'Complete Herbal' we have a marvellous revelation of remedies associated with astronomy, and what is called the 'Doctrine of Signatures,' implying that nature herself indicated, by unmistakable signs, the appropriate remedies for certain diseases. Thus we are told that turmerick was good for jaundice, and saffron for measles, and these remedies are now very generally used by the poor people in the country; indeed saffron finds many patrons amongst the poor of the cities and towns. Now, however, without believing in the efficacy of plants, either from their colour or from planetary influences, there are no doubt many that would yield satisfactory results. I might enumerate many plants growing on our downs, such as the scabious and the different orchids, that are worthy of investigation; but I have said enough on this subject.

With respect to the preparation of drugs, Professor Attfield gives some excellent advice relative to the importance of doing as much at home in this way as you can. For obvious reasons it is well to be able, from one's own knowledge, to certify as to the quality; at the same time it is the duty of those who take apprentices, to make many things which are more cheaply bought, if for no other purpose than to enable them to know how to do it. But, as the Professor himself says, "Some preparations will doubtless always be better made by one man than by another, or by few persons rather than by many." In the very nature of things this must be so. In most retail establishments, the tendency of the age is to award the preference to certain makers of well-established reputation,—for instance, Howard's Quinine, Morson's preparations, and others I might enumerate. But apart from these special preparations, there are other reasons why many things are better made on a large scale; indeed some of them, such as the mineral acids, acetic and citric acids, can only be made well and profitably in large quantities and on premises specially adapted for them. Then, again, gamboge, scammony, guaiacum and other gum resins cannot, except on a very limited scale be powdered at home. The mercurial preparations, the vegetable powders, and many other articles of a like kind, cannot well be done by an ordinary retail druggist. Leaving out of consideration the advantages which result from a division of labour, the cost of preparation is an important factor not to be lost sight of. The druggist has now a hard fight against competitors, and whilst I am fully convinced that success or non-success in business is largely dependent on the quality of goods which are sold, there are well-known manufacturers whose reputations for years have placed their names above suspicion, and therefore, without hesitating, the retailer orders of them with as much confidence as if all the articles were prepared by himself, although I must say that tinctures, syrups, ointments and such articles as can readily be made in large or small quantities on your own premises should be prepared there. The mere trader, not being a druggist, cannot compete with one who knows his trade, who can tell a good article from a bad one, and if his requirements necessitate his going to the wholesale dealer, his knowledge would teach him where he would be best served. Here the educated druggist has an advantage over the medical man, for it is a well-known fact that as a rule the profession have a very limited knowledge of drugs. A young man probably enters into some arrangement with a medical man, or he becomes a pupil of a provincial hospital; in the former case, if his master sends out his own medicines, his experience of drugs is very limited,—he has some dozen or two bottles which supply all his requirements. How can such a system convey anything like an adequate knowledge of the materia medica of the Pharmacopœia? And if the future medical man begins his career at the hospital he is supposed to learn of the dispenser a knowledge of drugs and dispensing. But what is the fact? Nine-tenths of the dispensers have in their ordinary daily duties more to do in exercising necessary care with quick dispensing, to be able efficiently to teach others, so that, with few exceptions, the knowledge thus acquired can never enter into competition with that of the well-informed druggist, and he has little to fear from competition in this quarter. Another source of evil may, and no doubt does, to a limited extent, now exist, and that is the wholesale houses becoming retailers. As a rule the more respectable houses confine their dealings to the retailer; but there are many small establishments, calling themselves wholesale dealers, that put up ounce bottles of tinctures and other things to supply grocers and small country shopkeepers in wide-spread districts with sparse populations insufficient to maintain a druggist. Such a system has its advantages; but when the population is sufficiently large to maintain what may be called a composite druggist, the employment of grocers and others not specially educated for the trade is an innovation that the legitimate druggist has to contend with. But I cannot entertain the thought, that such second-hand dealers in drugs have any chance of superseding the better-informed dealer, although he may charge a little less for his drugs; and however much we should like to adopt the suggestion of Professor Attfield, and have the sale of drugs confined to the druggist, and mere vendors not being druggists to receive drugs in "unbroken packets supplied by a not-far-distant registered and responsible pharmacist," I very much fear the unrestrained freedom of trade is an insuperable barrier to the adoption of any system for exclusive trading. Indeed, every day more and more illustrates what I have said on more than one occasion before, that no distinctive trade seems to exist; every tradesman poaches on his neighbour, and one of the last of these encroachments is to be seen in the stationer and bookseller's windows. Since taking 20 and 25 per cent. off new books, the provincial book shop exhibits cheap American clocks, watches and jewellery, so that, what with the toy and fancy trade displays of the draper, the multifarious exhibits of the grocer, the druggist is forced to do much that he otherwise would be glad to avoid. In a struggle for existence, pure pharmacy and scientific chemistry will, I fear, be delegated to the few, with the survival of the fittest.

Another and very important subject is now, and has been for some time, exciting considerable interest. I allude to the patent medicine trade. The only probability of practically placing this branch of trade in the hands of the pharmacist, is confined to those articles said to contain poisons; and it becomes a matter of great difficulty to control the sale of such articles as chlorodyne, soothing syrups and powders, aniseed balsam, and others of a like kind, although well known to contain a certain portion of some poisonous substance. They are not, as a rule, when given according to directions, dangerous, and it will, therefore, be a difficult matter to convince the Legislature that the exclusive sale of these articles should be in the hands

of the druggist. Government will not forego the large sums which they now receive for stamp duty, nor will they readily make any concession likely to diminish their interest. The counteracting influence suggested is the extension of our own proprietary articles. This course of action may, to a certain extent, succeed, but it can never displace those secret remedies which extensive advertising has impressed on a gullible public for effecting cures of real or imaginary maladies; the conscientious pharmacist would never condescend to recommend his preparations as *infallible* remedies, whilst the anxiety of the invalid often tempts him to forsake his medical adviser and seek alleviation from one or other of these sources—patent medicines or the pharmacist—and it is here that a difficulty arises, for, however much we may be disposed to avoid counter practice, we cannot, in justice to ourselves, do it, a demand is made for a certain remedy advertised, and the druggist supplies it, unless the applicant asks, as is frequently the case, "Can you suggest anything better?" Under the circumstances, surely we should be justified in exercising our judgment in giving something suitable, always taking care as far as possible to confine the practice to simple cases, or as Professor Attfield says, "Any trespassing on the purely medical domain would necessarily sooner or later involve commensurate punishment."

With respect to legislation the Pharmaceutical Society has certain powers conferred upon it; but it has been found in practice, like most parliamentary measures, defective, and the Council of the Society is most anxious to remedy many obvious defects. But when the subject is fairly considered in all its bearings two important problems present themselves—Can the well-being of the pharmacist be made to dovetail with the well-being of the public? Here difficulties present themselves; for whilst the trade coincide with Professor Attfield's views, that not only poisonous articles but the sale of compound drugs should be placed in their hands as being most likely to conduce to the health and welfare of the community, can the Legislature be induced to adopt this view? From the evidence we have already obtained I very much doubt it, and supposing the suggestion of Professor Attfield to schedule such innocuous drugs as might with safety be entrusted for sale to other hands than those of druggists could be carried out, I fear much difficulty would arise in producing such a classification as would satisfy the public and the Legsilature. And I do not think that the suggested curriculum, if adopted, would influence the Legislature, and induce them to give us greater privileges. At the same time there is the startling fact that 56 to 58 per cent. of the Preliminary candidates and 50 to 56 per cent. of the Minor failed during last year. Something must be done to remedy the evil, and the excellent paper read in February last before this Association, by Mr. Hornsby, coincides closely with the views expressed by Dr. Greenhow, in his report of the examinations, which states "the very inadequate early education of the large majority of the candidates" causes the failures. It therefore would indicate that the course adopted by the Council of the Pharmaceutical Society is the right one, viz., apprentices to pass the Preliminary before they are apprenticed, or at any rate that the three years of pupilage as a necessary condition shall date from the passing of the Preliminary, and without this the candidate cannot pass the Minor. To ensure the accomplishment of these objects the curriculum, requiring attendance on courses of suitable lectures at certain centres, seems necessary, notwithstanding that the evidence of Dr. Greenhow goes to establish the efficiency of the present examinations by asserting that in his opinion those who pass them are competent to be registered under the Pharmacy Act. Our friend, Mr. Hornsby, has so ably written on the subject of education that I need not refer to it further.

Before I conclude my paper I must advert to the reiterated statements in the Journal, asking what has the Pharmaceutical Society done? I contend that it has done very much to raise an institution which is generally recognized as a power both at home and abroad. Any matter connected with pharmacy of a public character is invariably remitted by the executive of the Government to the Society for its opinion and advice. Should a vacancy occur in any department requiring an efficient dispenser, those holding our diplomas are preferred. The very fact of appointing a worthy representative (Dr. Greenhow) to attend our examinations and report upon them is sufficient evidence of the interest which Government takes in our proceedings; and in order that our statutes may not be a dead letter, every coroner is annually supplied by the Government with a copy of the Register. I only regret that they too often, by their remarks, show a disregard for its contents. These are only some of the results of having an organized well-established institution to fall back upon. What would have been our position had there been no Pharmaceutical Society when legislative measures inimical to our interests were introduced? But there are unfortunately some individuals—like Sydney Smith's lemon-juice squeezers—who expect the Council of the Society to do improbable things, irrespective of Acts of Parliament and the loss of influence which would follow injudicious action. Having travelled somewhat from my text, I may be permitted, before I conclude, to go a little further, and I do so with the conviction that all those connected with or outside the Society will agree with me—that our Benevolent Fund is entitled to the support of *all*. The Committee, in the distribution of this fund, does not stop to ask if the candidate has directly or indirectly contributed anything to it; but in the spirit of true benevolence it aids the most needy, and I do think principals and assistants should readily respond to appeals which are continuously made for increased means.

A discussion ensued, in which Messrs. Padwick, Marshall Leigh and others took part, and a vote of thanks to Mr. Savage closed the meeting.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of this Association was held at the Royal Institution, on Thursday, November 24.

In the absence of the President, the chair was occupied by the Vice-President, Mr. A. H. Mason.

The minutes of the last meeting were read and confirmed, and the following donations announced:—The *Pharmaceutical Journal* and the *Canadian Pharmaceutical Journal.*

Mr. Conroy brought before the meeting the results of an examination of one of the class of spurious temperance beverages to which reference was made in the last report of the Commissioners of Inland Revenue. He reported that he had found it to contain alcohol equal to 25 per cent. of proof spirit.

A discussion followed, in which Mr. E. Davies, Mr. T. Fell Abraham and Dr. Symes took part.

The following paper was then read:—

Notes upon the Action of Glycerine on some Ferric Salts.

BY F. O. BROWN.

Often having had to dispense prescriptions containing tincture of perchloride of iron, or sometimes solution of perchloride of iron, in which glycerine has usually been ordered, I was led to make the following experiments. I commenced by making two mixtures as follows, viz.:—

No. 1.

℞	Tr. Ferri Perchlor.	℥iss.
	Glycerini	ʒvj.
	Aquæ Destill.	ad ℥vj.

No. 2.

℞	Liq. Ferri Perchlor.	℥iss.
	Glycerini	ʒvj.
	Aquæ Destill.	ad ℥vj.

Having dispensed the mixtures, I next proceeded to ascertain whether the preparations of iron I had used were in the ferric or ferrous state. On applying my reagents to a small quantity of each preparations, taken from the ordinary dispensing bottle which I had used in making the mixtures, I found both preparations to be in the ferric state.

The first reagent I applied was ferridcyanide of potassium, which gave a dark-green colour with both the liquor and tincture.

$$Fe_2Cl_6 + K_6Fe_2Cy_{12} = Fe_2Fe_2Cy_{12} + 6\,KCl.$$

Then to another portion of each, I added a solution of sulphocyanide of potassium, which gave a deep blood-red colour—

$$Fe_2Cl_6 + 6\,KCyS = Fe_2\ 6\,CyS + 6\,KCl.$$

Both mixtures, when first dispensed, were of a pale sherry colour, No. 1 (containing tincture) being slightly darker than No. 2, which I account for by the tincture being slightly darker than the liquor, no doubt owing to the presence of rectified spirit.

At the end of fourteen days, I noticed that both mixtures were paler in colour, but on applying the same reagents which I have mentioned in the previous part of my paper there was still a quantity in the ferric state, although the colour on applying my reagents was not so intense as when the mixtures were first dispensed. Up to this time the mixture had been well corked and in a shaded position. I then placed what was remaining of both mixtures in a window subject to a strong light and left them both loosely corked for fourteen days more, after which I found both mixtures were considerably paler in colour, in fact almost colourless, and on applying my reagents, I found a still greater proportion had been reduced to the ferrous state; in fact there was scarcely any remaining in the ferric.

On applying a solution of sulphocyanide of potassium a slight coloration was visible, owing to the presence of a little ferric. On the addition of ferridcyanide of potassium to another portion, I had a dark-blue precipitate of Turnbull's blue ($Fe_3Fe_2Cy_{12}$), showing the presence of a large quantity of ferrous salt—

$$3\,FeCl_2 + K_6Fe_2Cy_{12} = Fe_3Fe_2Cy_{12} + 6\,KCl.$$

Both mixtures showed the same results.

My reason for subjecting the same mixtures to the two experiments is that it is not an unfrequent occurrence that a customer gets a prescription dispensed, and whilst taking the first doses the bottle is kept securely corked and in a shaded place; after taking a few doses the patient feels considerably better and the mixture is put on one side, loosely corked, or perhaps without a cork and exposed to a strong light; after a while not feeling quite so well, the patient decides to try the remaining part of mixture which previously had done a great amount of good, not knowing whether the mixture (although exactly the same to look at) is the same as when first dispensed, or whether it is quite a different preparation.

On looking over the *Pharmaceutical Journal*, for September 23, on page 257, I find Mr. Schacht, in his valuable paper on the action of glycerine on some salts of iron, says "I found it necessary to record as the first memorandum, that the *tincture* of perchloride of iron taken from the ordinary dispensing bottle was no longer what it was when originally mixed, for it gave an emphatic bright green colour with ferricyanide of potassium." If I am not mistaken this reaction shows that the tincture of perchloride of iron *was* what it *was* when originally mixed, as Professor Attfield, in his 'Manual of Chemistry,' says:—"To a ferric solution add solution of ferridcyanide of potassium; no precipitate occurs, but the liquid is darkened to a *greenish* or olive hue, according to the strength."

Some discussion took place upon this paper, and a vote of thanks having been passed to Mr. Brown the proceedings terminated.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The members of this Association held their annual supper at the "Bear's Paw," Lord Street, on Thursday, November 30. It was numerously attended by the chemists of Liverpool and suburbs. Dr. Charles Symes occupied the chair, and Mr. A. Redford the vice-chair, in the temporary absence of the Vice-President.

After the usual loyal toasts had been given, the Chairman proposed "The Registered Chemists' Trade Association of Liverpool," and remarked that the Association had existed long enough and had done sufficient useful work to justify them in looking back with some amount of satisfaction at the past, and to encourage the members with bright hopes for the future. They would still welcome a large number of their brethren if they could prevail upon them to join the Association and accord their willing help. The Association was not a mere trades' union organization pledged to support and carry out selfish objects, but was a body willing to take the broad and most comprehensive view of whatever lay within their province. They would soon have to deal with a Pharmacy Act, as it seemed the Government was now fully prepared to support a Bill so long as it was just to the public. That was all the Association wanted, fairness to themselves and justice to the public.

Mr. Hocken, the Hon. Secretary, in responding said that kindred associations had taken the scientific part and this one the trade portion. He stated that during the past year a fifth edition of the 'Price List' had been issued, copies of which he had sent to all parts of the country. At some of the recent meetings, novelties in the trade and new remedies had been placed upon the table, attracting considerable attention and discussion. He also intimated that, during the coming season, it was intended to continue this and to have short papers on trade subjects. He promised that the Committee would do everything in its power to increase the credit and usefulness of the Association, and hoped it would continue to be an advantage to the city.

"The Pharmaceutical Society and the Chemists and Druggists' Trade Association of Great Britain," was proposed by Mr. Dickins and responded to by Mr. Mackinlay.

"The Liverpool Chemists' Association and Kindred Societies," was proposed by Mr. Parkinson, who specially urged the claims of the Benevolent Fund.

Mr. J. Woodcock, as President, responded for the Liverpool and Mr. Nicholson for the kindred societies.

The other toasts were "The Wholesale Trade," by Mr. Warhurst, and "The President" (given with musical honours), by Mr. Wyatt.

LEEDS CHEMISTS' ASSOCIATION

The first meeting of this session was held in the Library, on Monday, November 27, 1882. The President, Mr. G. Taylor, in the chair.

The minutes of the last meeting were read and confirmed, after which the President delivered an address.

After some preliminary remarks, he said: "In considering how I should proceed with my task it seemed to me that my first and foremost duty, and it is a very melancholy one, is to pay my humble tribute of praise to the memory of my much lamented predecessor. In the death of Mr. Stead this Association has lost one of its oldest and staunchest supporters. He was one of its founders, worked for it steadily and persistently, and died its President. His business tact and sage councils contributed largely to keep it afloat when threatened with wreck by the desertions of its members, and by his cheery good humour and buoyant spirits he has often sustained the courage of his fellow-workers amid very dark and gloomy surroundings. The same characteristics which made him so welcome a member of this Association rendered him equally useful in the management of

town's affairs. He represented the West Ward in the Municipal Council for a number of years, was a regular attender of its meetings and faithful in the discharge of his duties, and whether sitting in committee or in full Council he was, I believe, equally esteemed by his brother councillors. . . .

"I shall not attempt anything like a *résumé* of phamacy since you listened to the last presidential address, neither shall I attempt to describe to you the many interesting researches of many very clever men, both English and Continental, into the composition and decomposition, combinations and derivatives, characteristics, conversions, and, I know not what else of the vegetable alkaloids, and other abstruse chemical subjects, for I am quite unable to do so, but shall content myself by passing a few remarks upon some of the recent experiments or discoveries described in the Year-Book, having a practical bearing upon our calling. For instance, we are all more or less interested in teething powders, some of us perhaps in their personal administration, but all of us to some extent in their sale. It is pretty generally known that the basis of these powders is calomel, rendered palatable by the admixture of sugar. It is difficult, however, to reconcile the fact stated by a French pharmacist, M. Verne, that a mixture of this kind undergoes no change, and that, therefore, the asserted danger of prescribing calomel with sugar is fictitious, with the opinion of an English chemist, Mr. P. Hoglan, that sugar greatly promotes the conversion of calomel into corrosive sublimate, and is hence more or less dangerous when present in the system with calomel, and that the latter even at the temperature of the human body is an unstable compound. Practically I think the Frenchman is in the right, though probably in theory the Englishman is more correct. However, it is a subject worthy the attention of chemists, especially of those who sell large quantities of these powders, whether some substitute for the sugar cannot be found about the harmlessness of which there can be no doubt.

"M. Tedenat, I see, suggests phosphate of bismuth as a substitute for subnitrate in medicine on account of its stability. Whether this form is the best in all cases to substitute for the bismuth. alb. of the Pharmacopœia, I will not venture to affirm, but that the latter is a very troublesome customer to deal with when prescribed, as we so often find it, along with bicarbonate of potash or soda, I think there can be no doubt."

The President then referred to the various compounds of bismuth used in medicine, the ready way of preparing ferric hydrates suggested by Mr. P. Hodgson, in which, however, the author erred in suggesting the use of a carbonate instead of a caustic salt, the liquor sodæ or potass. of the B.P. being quite as easily obtained in the pharmacy and producing a better preparation as an antidote for arsenic.

"What is liq. opii sed.? or in other words, if a physician prescribes liq. opii sed. what preparation bearing that name should be used? If 'Battley' is mentioned no difficulty arises; but in nine cases out of ten no indication is given of the particular preparation required, and with the great number of different makers it is quite impossible to ensure a similar medicine from a prescription whose owner is continually passing from town to town, and consequently having his prescription dispensed at different establishments. It would be a great advantage to the retail trade if a form for the preparation of the well-known (at least in name) sedative was introduced into the Pharmacopœia under its proper appellation.

"Mr. D. B. Dott's interesting paper on 'The Solubility of the Salts of Morphia' is very instructive, and will repay a careful perusal. I have always found a difficulty in getting the commercial acetate of morphia to dissolve without the addition of a little acetic acid, whilst the bi-meconate I have always regarded as a very soluble and stable salt; further experiments are evidently needed to give more light upon the subject.

"The various pepsines now met with in the trade have a peculiar tarry odour, which I have been unable to account for; this must be due to some peculiar process of manufacture, as some prepared by myself, according to the B.P. process, has not this disagreeable smell, but, on the contrary, quite a savoury fragrance; perhaps it is due to the use of methylated spirit by other makers.

"The best method of coating pills does not appear to me by any means settled as yet, and affords a fair field for the display of original invention amongst chemists. All the modes hitherto adopted seem to be open to some objection. In one, the coating is too thick and increases the size of the pills too much, besides rendering them difficult to get perfectly round; another is too thin, resembling varnish; another not sufficiently soluble, and all cumbersome and tedious in manipulation. What is wanted is a coating that shall be elegant in appearance, readily soluble, thin, and yet durable, and that can be put on as readily as a coating of silver leaf. Some of those introduced into this country from America are certainly specimens of very elegant pharmacy, and some of those turned out on a large scale by our English makers are certainly very pretty; but what we want is something that a man can do in his own pharmacy, behind his own counter, in small quantities and well. How very common it is for medical men to put 'coated' after writing a prescription for pills, just as they used to put in 'argento rotundo.' These remarks have been suggested by M. Ditten's 'new method of coating pills' by rolling them in melted cocoa butter in a plate or flat-bottomed dish, then shaking them in a large proportion of starch powder and allowing them to cool. Coating in this way is said to protect the pills from the action of air and moisture, to prevent the evaporation of volatile ingredients and to give them in some degree the pleasant aroma of chocolate; but whether they would stand the test of a journey across the burning plains of Egypt and through the heart of Central Africa is doubtful.

"Leaving the region of pharmacy I should now like to make a few very brief remarks upon one or two burning questions. And first and foremost comes the question, the great question of co-operation *versus* individual enterprise. To those who are lifted out of the strife either by having already realized a competence or by having inherited a fortune it must be very interesting to watch the struggle and speculate upon the issue of the great battle now waging betwixt these two great forces, but to us, whose means of securing our daily bread hangs on the result, why we are very much in the position of the frogs against whom the boys were throwing stones; it may be sport to them, but it may be death to some of us. If co-operation in trade, call it by what name you will, Co-operative Societies, Mutual Supply Associations, Civil Service Supply Associations, is to succeed, and be pushed to its ultimate issues, I can see nothing else for it but that the small retail dealer, the man with small capital, must in the end be pushed off the face of the earth. In all large towns and centres of population those who live long enough will see some dozen gigantic stores with outlying branches erected and conducted by means of immense capital subscribed by different classes of society, and all the small shopkeepers merged in these colossal concerns as employees. A very miserable prospect. And whether it would be for the well-being of society that this state of things should come about is exceedingly doubtful, for long before Napoleon uttered his famous saying about the English being a nation of shopkeepers, those very shopkeepers were and have continued to be the backbone of England, and if you take out the backbone the whole body politic must come tumbling down.

"But, I said, *if* co-operation succeeds, and that is a very important reservation. The retail dealer, as a rule, cannot compete with these accumulations of capital, cannot write to the makers of all advertised patent medicines for a large parcel of their preparations and

enclose a cheque for the amount in such letter. Probably his capital to commence business with is only £500; out of which he may pay £150 for fittings, another £200 or £250 for stock, and the balance left will be none too much to meet current expenses; he may go on for years, perhaps for life, just able to keep his head above water, and in a general way the utmost he can do is, to pay cash for small quantities as he wants them from the wholesale dealers, and then he loses the first-hand buyers' extra discount.

"If, however, the retailer cannot compete in the matter of capital with these concerns, there are other points in which I think he has the advantage. Personal supervision perhaps is the most telling. Wherever you have divided responsibility, as in a board of directors or managers, buyers for this department and buyers for that department, with numbers of employees not under the immediate supervision of a personally interested head, the door is open for any amount of bribery, corruption and waste; and if all be true one hears of co-operative societies they are not exceptions to this rule. Whereas the small dealer has his little store all around him; his one or two helps are immediately under his eye; he saves one person's wages by his own hands, and in some cases is still further assisted by his wife, and perhaps one or two members of his family. Well, then, in the next place he takes his little store, be it drugs, grocery or drapery, with himself as the presiding genius, and drops it down, so to speak, just under the noses of his customers, whilst his colossal opponents must plant themselves in a central position (of course they may and do throw out branches, but these lack the personal supervision element more than the other), and so in this way he catches many a rainy day customer. Then, lastly, there is the incentive to enterprise which every man must feel more or less who knows himself to be his own master, and that the making or the marring of his fortune rests in his own hands.

"These remarks do not apply to large retail establishments of various trades, or even some of the leading men in our own business, excepting so far as they go to prove the success attainable by individual enterprise, for they are quite capable of taking care of themselves and competing with any corporation. In fact I am disposed to think that we retail druggists have more to fear from these pushing private individuals with capital at their backs than we have from associations.

"This brings me to another burning question, the sale of patent medicines containing poisons by unregistered men. Here, gentlemen, I think we have a real and tangible grievance. That a man, simply because he buys a 5*s.* licence and puts a 1½*d.* piece of diverse coloured paper over the top of a bottle or a box, should be allowed to ride right through the spirit of the Pharmacy Act is not only absurd but unjust. It is absurd, because through this loophole in the Act the country is being flooded with poisons under insidious names, from which it was one of the principal alleged reasons for the passing of the Act it was necessary the public should be protected. And it is unjust, in that whilst a chemist before ever he can sell a pennyworth of laudanum or dispense a grain of morphia must now pass a couple of stiff examinations, have his name kept on the register, and be subject to all the pains and penalties attaching to any infringement of the law, his next door neighbour, be he bookseller or barber, can, by the simple proviso before named, sell any quantity of morphia, prussic acid, chloral, chloroform or other poison which any adventurous maker may think fit to put up and christen a patent medicine. I think that any one putting up a proprietary article containing a scheduled poison should be compelled to state on the label the name of such poison, together with the word "poison" and his own name and address, and that the retailing of such proprietary poisons should be confined to the hands of registered chemists, who should in their turn also affix their names and addresses. This would ensure the public being properly forewarned of the nature of the article they were purchasing and restrict the sale of poisons to those who are alone qualified by Act of Parliament.

"I intend bringing this subject before the Committee of this Association shortly, when I hope they may see their way clear towards taking some steps for bringing this question under the notice of the proper authorities, or for getting up an agitation throughout the country against the law as it now stands.

"Before closing I should like to say a very few words to the young men just coming into our calling. Do not slip the days of your apprenticeship as a time for study and observation. Whether a few months' cramming at some of the establishments in London, or even at the Pharmaceutical Society's rooms, be the quickest and easiest way of getting through your examinations or not I will not say; but this I will venture to affirm, that the amount of information required of you at those examinations, if acquired by a steady day by day reading and observation during the term of your apprenticeship, and by availing yourselves of such courses of instruction or lectures during the time within your reach, will be far more likely to stick to you and remain ready at your beck and call in future years, than the same amount thrust into your head at high pressure, for the moment the pressure is removed and your diploma obtained, then off goes your rapidly acquired knowledge, and you are left very much where you were before you went up for examination."

Mr. Reynolds had much pleasure in proposing that the best thanks of the meeting be given to Mr. Taylor for his interesting address. With regard to one of the questions brought forward, namely, What is meant by liq. opii sed.? he might say that in compounding medicines he always used Battley's preparation unless it was otherwise ordered, as this was the first introduced; but there were many medical men who bought cheaper preparations under a similar name, and it would be better if pharmacists had a guide to assist them in solving this and many other problems presented in connection with their business.

Mr. J. Abbott thought the want of solubility in the morph. acet., referred to by the President, was due to the gradual vaporization of the acetic acid, and it was necessary to add a little acetic acid to get a clear solution; with this addition he had been able to dissolve 1 part of the salt in 3 of water.

Mr. E. Yewdall had much pleasure in seconding the motion proposed by Mr. Reynolds. He thought the danger threatened by co-operative societies would soon be a thing of the past. Quite recently a customer at one of these stores had been supplied with saltpetre in place of carbonate of soda, and he felt quite sure that if chemists and druggists paid careful attention to the requirements of customers so as to avoid mistakes, they would be able to maintain their position. He thought, however, they were making a great mistake in taking apprentices for short periods of servitude. Formerly seven years was the time a youth had to serve, and now they took them for four years, thus producing five generations of chemists instead of three in nearly the same time.

Mr. Branson thought that recently prepared and neutral acetate of morphia would dissolve readily in 3 parts of water, but it was so apt to change by keeping, that most commercial specimens contained a basic salt.

Mr. P. Jefferson had pleasure in supporting the motion, and referred to the special advantages offered to the youths of the present day to those which existed fifty years ago.

The resolution was carried with applause, and having been acknowledged by the President, the meeting separated.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the Cross Keys Hotel, on Thursday evening, November 23. In the unavoidable absence of the President (Mr. Councillor Myers), the Vice-President, Mr. George Hayles, presided.

The Secretary gave an epitome of the proceedings during the past year, which was accepted as the report.

The balance sheet for the past year, having been audited, was read and approved of.

The following were elected as office bearers for the year ensuing:—President, Mr. Councillor Myers, re-elected; Vice-President, Mr. George Hayles, re-elected; Secretary and Treasurer, Mr. C. B. Bell, re-elected. Committee: Mr. James Oldham, re-elected; Mr. W. H. Hammond, re-elected; Mr. W. Price, re-elected; Mr. T. W. Ellis, elected.

Votes of thanks to the various officers for the valuable services they had rendered during the past year was accorded.

BLACKBURN CHEMISTS' ASSOCIATION.

One of a series of lectures for this season was delivered on Friday evening, December 8, 1882, by Mr. J. G. Tier, on the subject of "Acetone, its Manufacture, History, etc." Mr. Joseph Hindle, President.

There was a good attendance, and votes of thanks were accorded unanimously to the lecturer and chairman.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, December 7, Dr. Gilbert, F.R.S., President, in the chair.

The following certificates were read for the first time:—G. Chandra Basu, W. R. Flett, E. C. Gill, J. Hunter, T. Jenner, W. W. J. Nicol, F. W. Richardson, E. S. Spencer, C. A. Serre.

During the evening a ballot was held and the Scrutators, Messrs. Greenaway and Kingzett, declared the following gentlemen to be duly elected Fellows of the Society:—J. S. Bishop, E. E. Berry, F. W. Branson, R. Blair, T. R. Cowie, R. Carruthers, R. Coulthard, W. J. Chrystal, E. G. Clayton, J. T. Dunn, H. L. Dampier, A. G. Earl, G. Gray, A. G. Howard, W. A. L. Hammersley, J. L. Howe, H. Hotblack, A. E. Johnson, E. Jackson, A. Keen, J. Kilner, J. D. McCarthy, H. C. Newton, S. G. Phillips, R. H. Parker, T. F. Peppe, S. Rideal, G. M. Taylor, T. E. Vasey.

The two following papers were read by the Secretary:—

On the Condensation Products of Oenanthol. By W. H. Perkin, jun.—Much work has been already done on the condensation products of isobutyric, isovaleric and œnanthylic aldehydes, but in many cases only the formulæ of the products obtained have been given. The author therefore undertook the present research to obtain, if possible, some clue as to the constitution of the bodies formed especially from œnanthol. In the first section of the paper the action of alcoholic potash on œnanthol is studied. Dilute potash was used and two acids were found (heptylic acid and an acid, $C_{14}H_{26}O_2$, boiling between 270° and 290°) in combination with the potash. From the oily condensation products two bodies were isolated. The principal one being an aldehyd, $C_{14}H_{26}O$, a colourless oil boiling 277°–279°, the second condensation product is a thick light yellow oil with disagreeable smell and burning taste, boiling at 330°–340°; it was probably an aldehyde having the composition $C_{28}H_{50}O$. The second section of the paper refers to the action of zinc chloride on œnanthol. The reaction is violent. The œnanthol was agitated with water and a very small quantity of zinc chloride used. The principal product is again the body $C_{14}H_{26}O$. The action of acetic anhydride on the aldehyde $C_{14}H_{26}O$ is then examined; it acts simply as a dehydrating agent, $2\,C_{14}H_{26}O = C_{28}H_{50}O + H_2O$. On fusing this substance, $C_{28}H_{50}O$, with caustic potash, heptylic and hexylic acids were formed. Nascent hydrogen converts the body $C_{14}H_{26}O$ into an alcohol, $C_{14}H_{28}O$, boiling at 280°–283°; it is not a saturated body, and by the further action of nascent hydrogen it is converted into another alcohol, $C_{14}H_{30}O$, boiling at 270°–275°. The author then studied the oxidation of the body $C_{14}H_{26}O$, but heptylic and hexylic acids were the chief products. Small quantities of an acid with a high boiling point were produced, which probably had the composition $C_{14}H_{26}O_2$. Alcoholic potash acts upon $C_{14}H_{26}O$, forming heptylic acid and an acid, $C_{14}H_{26}O_2$, boiling at 275°–280°. From a general consideration of the various reactions the author concludes that this body, $C_{14}H_{26}O$, has the constitution—

$$\begin{array}{c} CH_3-(CH_2)_5-CH \\ \| \\ CH_3-(CH_2)_4-C-COH \end{array}$$

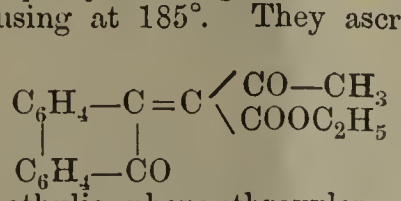
or hexyl pentyl acrylic aldehyd.

On the Condensation Products of Isobutyl-aldehyd. By W. H. Perkin, jun.—A short time since there appeared in the *Berichte* an abstract of a preliminary notice by Fossek, from the *Monatshefte der Chemie*, on the action of an aqueous solution of caustic potash on isobutyl-aldehyde. As the author has for some time been working on these condensation products, he felt himself compelled to publish his results, although at present not quite complete, especially as they are quite different from those obtained by Fossek; the action of alcoholic potash seems to be quite distinct from that of aqueous potash. The author first describes his method of preparing the isobutyl-aldehyde; 50 grams of this substance are first diluted with 100 c.c. of absolute alcohol, and 40 c.c. of 10 per cent. solution of alcoholic potash slowly added, the temperature never being allowed to rise above 30°; after standing twelve hours the mixture is warmed to 50° for a few minutes and then left to cool. The potash solution contained isobutyric acid and a new acid, $C_{12}H_{22}O_3$, boiling at 245°–255°, distilling without decomposition, not solidifying at −10°. Fossek, with aqueous potash, obtained an acid melting at 75°, with composition $C_8H_{16}O_3$. The oily product of the above reaction, after fractionation, gave a distillate boiling between 154° and 157°, having the formula $C_{12}H_{22}O_2$. Much residue of a higher boiling-point was left in the retort. Fossek, by the action of aqueous sodic acetate on isobutyric aldehyde, obtained a body $C_8H_{14}O$. By the action of nascent hydrogen on the aldehyde $C_{12}H_{22}O_2$, an alcohol, $C_{12}H_{24}O_2$, was formed, boiling at 170°–175°; it is a colourless oil, which does not solidify at −10°; it has the same formula as ethyl propylpinakone, but a different boiling point. This alcohol when treated with acetic anhydride gives a diacetate, $C_{16}H_{30}O_4$. A vapour density determination gave numbers about one-half of those required by theory. The higher condensation products of isobutyl aldehyde were next studied by using twice the above-mentioned quantity of alcoholic potash and heating the mixture nearly to the boiling point for ten minutes. Oily products were separated and contained small quantities of the bodies $C_{12}H_{22}O_2$ and $C_{16}H_{30}O_3$, but the principal portion distilled over at 223°–225°, and had the composition $C_{20}H_{38}O_4$; it is apparently an aldehyde; a vapour density determination gave about half the calculated density. By the action of acetic anhydride a mono and a diacetate were formed. After this body, $C_{20}H_{38}O_4$, had been distilled off, a body boiling at 250°–255° was obtained, having the composition $C_{24}H_{44}O_4$. Another body, boiling under 100 m.m. pressure at 227°–229°, had the formula $C_{28}H_{48}O_3$.

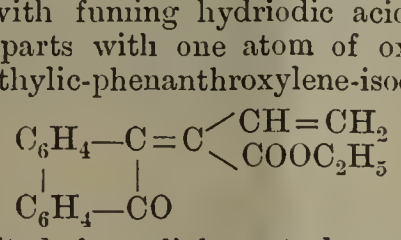
Dr. Japp then read a paper—

On a Condensation Product of Phenanthraquinon with Ethylic Aceto-acetate. By F. R. Japp and F. W. Streatfeild.—By heating a mixture of phenanthraquinon and

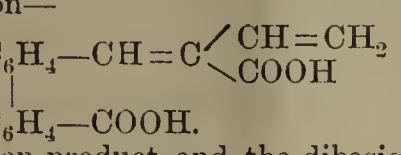
ethylic aceto-acetate with a solution of caustic potash, the authors obtained a condensation product of the formula $C_{20}H_{16}O_4$, crystallizing from benzene in white silky needles fusing at 185°. They ascribe to it the constitution—



and the name ethylic phenanthroxylene aceto-acetate. By treatment with fuming hydriodic acid in the cold this compound parts with one atom of oxygen, and is converted into ethylic-phenanthroxylene-isocrotonate—



which is deposited from light petroleum in groups of colourless crystals, fusing at 124°. This compound dissolves in dilute caustic potash on warming, and on acidifying with hydrochloric acid a new acid is precipitated, which by recrystallization from boiling phenol is obtained in short colourless needles, fusing at 295°. This acid is formed from the preceding compound by replacement of the ethyl group by hydrogen, and simultaneous assumption of the elements of water. The formula is therefore $C_{18}H_{14}O_4$. An examination of its salts showed that it was dibasic. The authors assign to it the constitution—



Both the reduction product and the dibasic acid derived from it yield on destructive sublimation long colourless needles of a new compound, fusing at 213°, which gave on analysis figures agreeing with the formula $C_{14}H_{10}O$. The authors suggest that this compound may be the desoxybenzoïn of phenanthrene $\begin{matrix} C_6H_4—CH_2 \\ | \qquad | \\ C_6H_4—CO \end{matrix}$ but the quantity obtained was insufficient for further investigation.

Dr. Armstrong then gave a short communication—

On the Constitution of Lophin.—This was a criticism of Dr. Japp's paper read at the last meeting. The author claimed that Radziszewski's formula, and especially his own modification of it $\begin{matrix} Ph—C—N \\ | \qquad \diagdown \\ \qquad\qquad CHPh \\ | \qquad \diagup \\ Ph—C—N \end{matrix}$ was applicable in explanation of the reactions of lophin. He objected to Dr. Japp's use of the argument from analogy, on the ground that the bodies obtained by the action of aldehydes on phenanthraquinone were not analogues of lophin, and, he urged, that since in the great majority of cases in which aldehydes enter into reaction with other bodies, the radicle CHPh of the aldehyde remains intact, the argument from analogy would lead us to prefer the symmetrical rather than the unsymmetrical formula adopted by Dr. Japp. The formation of benzamide and dibenzamide on the oxidation of lophin, it was pointed out, is not difficult to explain, and the production of benzoic acid on heating lophin with hydriodic and hydrochloric acids is probably a consequence of a purely hydrolytic action. Incidentally, Dr. Armstrong objected to Dr. Japp's use of the term "intramolecular change" in cases involving no transposition of atoms.

Dr. Japp briefly replied to the criticisms of Dr. Armstrong, and reiterated his conviction that the formula proposed by him agreed best with the known decompositions, etc., of lophin, and he failed to see how Radziszewski's formula accounted for some of the known reactions of that body.

Mr. S. U. Pickering then read a paper—

On the Constitution of Molecular Compounds: the Molecular Weight of Basic Ferric Sulphate.—Two methods of notation are commonly employed to represent basic compounds. Thus with basic ferric sulphate, $2Fe_2O_3\ SO_3$, or $Fe_2(SO_4)_3\ 5Fe_2O_3$; in this latter an analogy between a basic salt and a hydrated salt is hinted at. If the first formula is correct, the molecular weight is 400; if the latter, m.w. = 1200. The author has, in the present paper, endeavoured to determine the molecular weight of basic ferric sulphate by ascertaining the unit of water removable from a hydrated specimen of it. The author gives details as to the preparation of the sulphate, the hydration of it and the loss of water under different conditions. If the molecular weight be 1200, thirty-three different hydrates are possible; he obtained fourteen hydrates, all of which indicate the number 1200, and he concludes that it is practically a certainty that the molecular weight of basic ferric sulphate is 1200 and its formula $Fe_2(SO_4)_3,5Fe_2O_3$.

Mr. Toms then read a paper on—

The Chemistry of Hay and "Ensilage."—The author has analysed various samples of hay and contrasted them with analyses of "ensilage," *i.e.*, grass buried whilst green in a water-tight pit or "silo," and subjected to pressure. It is well known to chemists that haymaking is not a mere drying of grass, but that a fermentation, during which the grass loses its green colour, also takes place, which developes the well-known perfume of hay. A specimen of good hay, dried, contained:—Fatty matters, 2·17 per cent.; free acetic acid, 1·89; sugar, 3·42; starch, 12·46; gum and mucilage, 27·25. A specimen of brown hay from the same rick as the last, but from a portion of the stack which had heated, contained:—Fatty matters, 4·26; aldehyde, which formed a mirror with ammonio silver nitrate; free acetic acid, 5·38; sugar, 6·94; starch, 3·42; gum and mucilage, 24·77. More than two-thirds of the starch had thus disappeared and apparently had been converted into sugar, etc. Three specimens of ensilage were analysed; one differed very little from ordinary grass. The second was brown and smelt strongly of tobacco; it contained more acetic acid and sugar, but less starch. The third specimen represented fodder, which had been buried eighteen months; it still contained starch sugar, but was not acid and was mouldy.

Mr. O'Sullivan did not think that the author had proved the presence of starch in the hay or ensilage, because other substances, such as gum and mucilage, when boiled with dilute sulphuric acid, furnished cupric oxide-reducing substances.

Dr. Gilbert said during his recent visit to America he had heard a good deal about "ensilage," and the process seemed to be thought much of in that country. The crops, too, of succulent maize, etc., seemed well suited for it. It was essential for a good result to put all the materials as quickly as possible in the "silo," and put on a pressure of 100 to 150 lbs. per square foot almost immediately. He suggested that unless samples of ensilage taken for analysis were kept under pressure during transit the product might be completely changed. The process was very suitable for the preservation of the pulp from the sugar beet.

The Secretary then read a paper on—

Certain Brominated Carbon Compounds obtained in the Manufacture of Bromine. By S. Dyson.—The author has separated from a liquor obtained as a bye-product at the North British Chemical Company's Works, carbon tetrabromide, bromoform and chlorobromoform; these substances were identified by analysis, boiling point and vapour density determinations.

Mr. W. H. Perkin then read a note on—

The Preparation of Diphenylene Ketone Ether.—A quantity of salicylic acid was heated with acetic anhydride, the mixture was boiled and the excess of acetic anhydride distilled off. The residue, consisting chiefly of salicylide, was distilled, and an oily product came over which solidified to a crystalline mass. On purification pale yellow needles were obtained, having the composition $C_{13}H_8O_2$, fusing at 170°. The yield is 30 to 40 per cent. The author's son, Mr. A. G. Perkin, is engaged in a study of the derivatives, etc., of this substance.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held on Wednesday, November 29, when a paper on "Pharmaceutical Politics" was read by Mr. R. Winfrey.

The author divided the subject into three parts:—(1) The preparation and elaboration of drugs; (2) prescribing simple remedies by chemists; (3) the necessity of further pharmaceutical legislation. With regard to the first, he held it as very desirable that all preparations should be made by the chemist himself, but practically this could not be entirely carried out; in many cases things could be bought much better than they could be made on a small scale. On prescribing he could not do better then endorse the remarks of Professor Attfield. He thought that in cases where a druggist was free to sell a patent medicine he should be equally free to sell a remedy of his own. This sale of simple remedies would do much to prevent the sale of patent medicines. At present both those chemists and doctors who hold extreme views play into the hands of the patent medicine makers. With regard to further legislation he did not think it reasonable or even desirable to expect a monopoly in the sale of drugs; the superior knowledge of the chemist, when that could be used, would prevent his suffering from severe competition, and ordinary trading he must be content to conduct on trade principles. The only protection he thought just or desirable was in dispensing, and this he thought would before long be granted.

A long discussion took place, in which Messrs. Wrenn, Parkinson, Kerr, Cooper, Hartridge, Woods, Palmer, Alcock, Phillips, Millhouse, Wyatt and Hadfield took part, after which a hearty vote of thanks to Mr. Winfrey brought the meeting to a close.

Parliamentary and Law Proceedings.

Alleged Defective Sweet Spirit of Nitre.

The following case came before the South Shields bench of county magistrates on November 7:—

John Atkinson, general dealer, Harton Colliery, was summoned and charged by Superintendent Scott with selling to him sweet spirit of nitre, not being of the nature and quality asked for.

Superintendent Scott deposed that he bought three ounces of sweet spirit of nitre of Mr. Atkinson, which for analysis he divided into three parts, one he gave to Mr. Atkinson, one he took to the county analyst, and the other he kept himself. The analyst's report was now before the bench, and stated that its gravity was a little too low, that it was totally wanting in nitrous ether, and therefore of no medicinal value.

Mr. G. R. Duncan defended, and called Mr. Atkinson, who, being sworn, said that he sold the nitre pure, just as he got it of Messrs. Mays and Son.

Mr. Sergent was then sworn, and said that he was a chemist by examination, an assistant of Messrs. Mays and Son, that he in presence of Mr. Mays tested the spirit of nitre, and found its specific gravity ·850. He also tested it for nitrous ether, and found it present.

Mr. Mays was then sworn, and said that he was a pharmaceutical chemist, and had been more than forty years in business. He bought the sweet spirit of nitre of one of the first makers in London, Messrs. Davy, Yates and Routledge, and had always found their preparation good, and as for his firm, they sold it undiluted, as they got it. He had examined the sample left with Mr. Atkinson by Mr. Scott, and found it of gravity ·850, and that it did contain nitrous ether. As to the last, the gentlemen on the bench could judge for themselves, for the sample before them spoke for itself as to that—to anyone whose senses of smell and taste were not impaired. It was the spiritus ætheris nitrici dulcis of the London Pharmacopœia—the sweet spirit of nitre which it was the allowed usage of the trade to sell, as they had done many years before the British Pharmacopœia was written, and which the public liked better than the British Pharmacopœia preparation, which always tasted rather sour, but which last it was the duty of chemists to use in prescriptions.

The scientific evidence being contradictory, Mr. Duncan asked to have Superintendent Scott's sample sent for examination to the Government analysts at Somerset House. This was ordered, and their report, being now before the court, was read, and as it agreed with Mr. Mays's evidence *in toto*, the case was dismissed.—*Shields Daily News.*

BOOKS, PAMPHLETS, ETC., RECEIVED.

Elements of Dental Materia Medica and Therapeutics, with Pharmacopœia. Third Edition. By James Stocken, L.D.S. Assisted by Thomas Gaddes, L.D.S. London: J. and A. Churchill. 1882. From the Publishers.

The Chemists and Druggists' Diary, 1883. London: Office of the Chemist and Druggist. From the Publishers.

Notes on the Detection of Acids (Inorganic and Organic) usually met with in Analysis. By J. William James, Ph.D., F.C.S. London: J. and A. Churchill. 1882. From the Publishers.

Correspondence.

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

The Extract of Meat Case.—We have received from Mr. Charles Rotter, Secretary to the Liebig's Extract of Meat Company, a letter in which, at the desire of the Board, he refers us to Liebig's paper in the Annals of Chemistry, for 1847 (vol. lxii., p. 361), stating that Proust had many years before described extract of meat, and recommended the use of it to the French Government. Mr. Rotter appears to be under the impression that we were not aware of this publication, or of the precise nature of Liebig's claims with regard to the extract of meat, and refers to our editorial comments on this subject (before, p. 406) as supporting his assumption. We believe that it is unnecessary in reply to do more than say that those comments merely had relation to the statements brought forward in evidence at the trial, and in so far we fail to perceive that they stand in any need of correction.

J. Richardson is recommended to send his question to one of the Dental Journals.

Sarsæ.—Other things besides the name would have to be taken into account. The question is one for a solicitor.

J. K.—Coffin's Composition Powder is not the subject of a patent. The following recipe, taken from one of Dr. Coffin's works, has already been published in this Journal:—"Bayberry bark, 4 oz.; Pinus Canadensis, 2 oz.; Ginger, 2 oz.; Cayenne, ¼ oz.; Cloves, ¼ oz.; all finely pulverized and well mixed. Ordinary dose, a tea-spoonful in a cup of hot water, sweetened." Other recipes may be found by referring to the General Index.

Lignum.—We are unable to identify the wood, but might, perhaps, if you could furnish any information as to its history.

M. P. S.—Several recipes for Ung. Rumicis c. Sulph. will be found in the *Pharmaceutical Journals* for Oct. 23 and 30, 1880, pp. 346 and 367.

J. Robertson.—*Amomum angustifolium.* See the Museum Catalogue.

Communications, Letters, etc., have been received from Messrs. Hickling, Palmer, Wells, Richardson, Hill, D. G.

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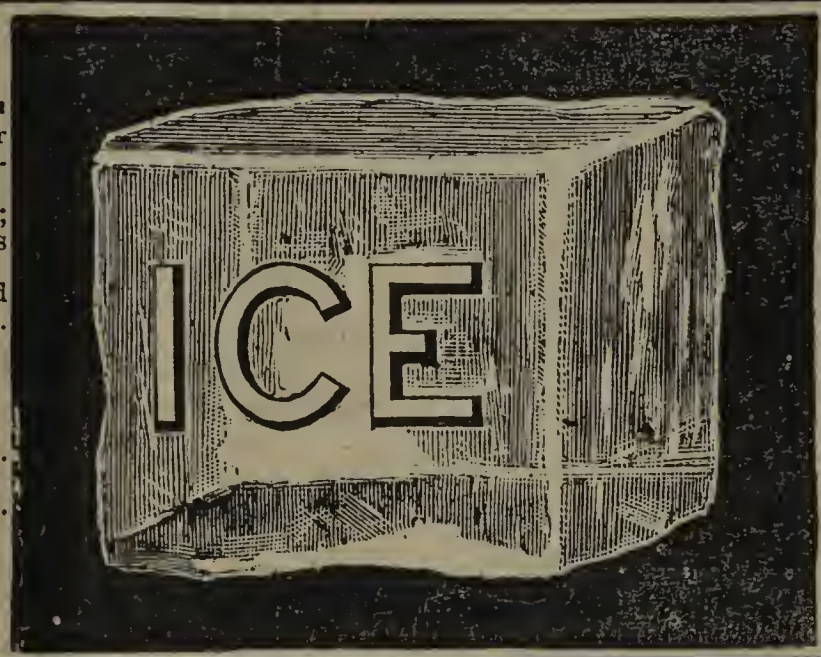

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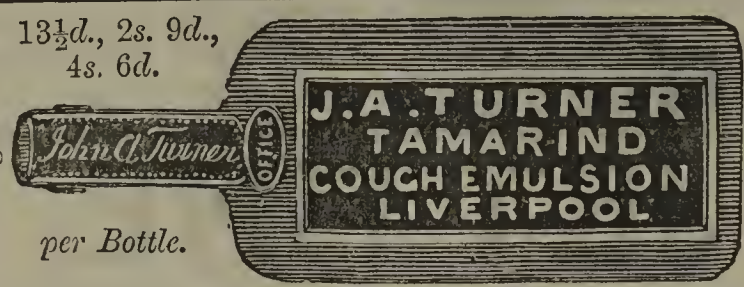

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By order. JAMES W. HILL,
Clerk to the Guardians.

Clerk's Office, Workhouse,
Gray's Inn Rd., W.C.
7th December, 1882.

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The
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AND
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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.
ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

LIBRARY AND MUSEUM.
SPECIAL NOTICE.

The Library and Museum will be closed on Monday and Tuesday, December 25th and 26th, and will not be open in the Evening on December 27th, 28th, and 29th.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 12 o'clock at noon, on the first Tuesdays in January, April, July, and October. Candidates must give notice to the Registrar on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the Examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other [illegible] or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

NORTH BRITISH BRANCH,
119A, GEORGE STREET, EDINBURGH.

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WANTED. — The PHARMACEUTICAL JOURNAL for January 11th, 1873. Full price will be given by the Secretary, 17, Bloomsbury Square, W.C.

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OF THE

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FORTY-FIRST SESSION, 1882-83.

CHEMISTRY AND PHARMACY. .....Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

PRACTICAL CHEMISTRY .....Professor ATTFIELD.
Daily at 10 o'clock, in the Laboratory.

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MARY ELIZABETH DIXON offers to every subscriber who voted in her favour her sincere and heartfelt thanks. To her late husband's many pharmaceutical friends who interested themselves in her behalf she offers her deepest gratitude.

HENRY EDWARD DAVIES, one of the successful candidates at the Election of Annuitants on the 15th inst., desires to return his most grateful and sincere thanks to the many friends and voters who so kindly supported his case.

MRS. C. M. A. SUTTERBY tenders her sincere thanks to all friends who by their votes and interest have secured her Election.

THE CHEMISTS'
SEVENTEENTH ANNUAL BALL

AT

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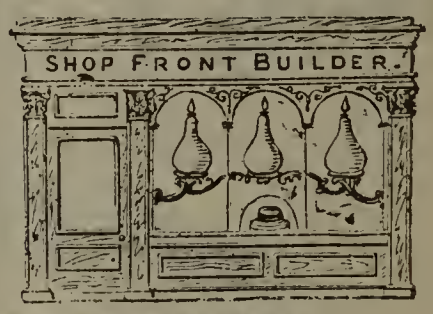

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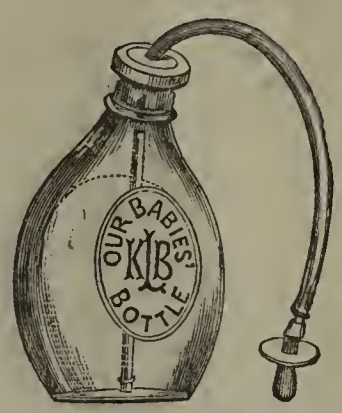

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Arnica	"	2	8	0
Belladonna	"	2	14	0
Capsicum	"	2	0	0
Iron	"	2	8	0
Opium	"	3	12	0
Poor Man's	"	2	8	0
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Porous or Plain Spread, size, 7 in. wide by 1 yard long.

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Aconite and Belladonna	per dozen,	1	16	0
Belladonna	"	1	7	6
Blister, Cantharidal	"	1	7	0
Capsicum	"	1	7	6
Mercurial	"	1	16	0
Opium	"	1	16	0
Pitch Burgundy	"	1	7	6
Roborans	"	1	7	6
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Mustard Plasters,

Spread on Cotton Cloth.

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Envelopes, containing 6 leaves	"	6	0
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Yard Rolls, 6 inches wide	"	10	0
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QUALITY IS OF FIRST IMPORTANCE

THE PHARMACOPŒIAL EXTRACTS OF ALOES AND THEIR PREPARATION.*

BY ROBERT AITKEN.

The above subject was brought under my notice in the following manner. A short time ago a friend of mine complained that a prescription which had been made up in different towns varied very much in effect. The prescription was for 1 grain pills of extract of aloes, combined with a little capsicum. As the variation evidently lay with the extract of aloes, I procured a sample from a firm who had dispensed the prescription, and was rather surprised to find it contain about 30 per cent. of resin, which no doubt accounted for its weak action. A second sample procured from another firm who had also dispensed the prescription gave about 8 per cent. of resin. These experiments led me into an examination of several samples of extract, and I found that all those tested gave evidence of the presence of resin, some in large proportion, some in small.

To elucidate the matter further, twelve samples of extract (both Socotrine and Barbadoes) were procured from Edinburgh, London and Dublin, and examined with the following results:—

No. 1. Socotrine, gave 20 per cent. of resin.
No. 2. Barbadoes, gave 25 per cent. of resin.
No. 3. Socotrine, gave 25 per cent. of resin.
No. 4. Socotrine, gave 25 per cent. of resin.
No. 5. Socotrine, gave 10 per cent. of resin.
No. 6. Barbadoes, gave 8 per cent. of resin.
No. 7. Socotrine, gave 8 per cent. of resin.
No. 8. Barbadoes, gave a trace of resin.
No. 9. Barbadoes, gave 6 per cent. of resin.
No. 10. Socotrine, gave 8 per cent. of resin.
No. 11. Socotrine, gave 15 per cent. of resin.
No. 12. Barbadoes, gave 20 per cent. of resin.

The method I employed was as follows:—A certain quantity of the extract was weighed out, powdered, and dissolved in boiling distilled water; on allowing it to cool, the resin gradually deposited on the sides and bottom of the mortar; stirring seemed to facilitate the separation. The resin was collected on a weighed filter and well washed with cold distilled water, until the washings were colourless. The filter was then dried and weighed; the difference between the gross weight and the weight of the filter giving the amount of resin present.

In most of the samples which contained a large quantity of resin, the latter separated in a sticky mass; in those which contained least, the resin was suspended in the solution as a fine brown powder, in some instances so fine as to run through a paper filter.

The different varieties of aloes as prepared for the market contain a considerable amount of resin, caused by the heat employed in evaporating the juice; and in order to free the aloes from this and other inert matters the Pharmacopœia orders the preparation of the extracts of Socotrine and Barbadoes aloes. Consequently one would expect these extracts to be perfectly free from resin. The Pharmacopœia recommends two methods of evaporation, either by means of a water-bath or a current of warm air. In order to ascertain whether the first process would yield an extract free from resin, I prepared some extract from Socotrine aloes, and evaporated the liquid by means of a water-bath. I obtained about 50 per cent. of extract, and on testing it found resin even in portions which had not come much in contact with the sides of the porcelain vessel used for evaporation. I then made another sample of extract, but used a current of warm air instead of the water-bath. The result was an extract perfectly free from resin. Some of this last sample was then exposed to an increased heat on the top of a boiler, and, after a short exposure, showed the resin in the form of a fine brown powder, thus showing how prone the drug is to change under the influence of heat.

From these experiments it will be seen that in order to procure the extract free from resin, the second method alone ought to be used, and even that carefully attended to.

The causes of so much difference in the extracts is owing, I consider, to careless preparation, very few evidently choosing to prepare them by the slow process, and those who are in the habit of making large quantities are more likely to adopt the quicker method of the water- or steam-bath, though, as I have shown, such a method would lessen considerably the activity of the extract by the formation of resin.

* Read at a Meeting of the North British Branch of the Pharmaceutical Society, Wednesday, December 13, 1882.

PREPARATION OF SYRUPUS FERRI PHOSPHATIS BY A NEW METHOD.*

BY DANIEL GORRIE.

Of all the pharmacopœial syrups none are so unsatisfactory as those of iron, and the literature which has been written upon them is able and voluminous; it is with considerable diffidence, therefore, that I submit this paper. In syrupus ferri phosphatis there are two sources of dissatisfaction, (1st) in its preparation and (2nd) in its tendency to spoil by keeping. The official method of preparation favours oxidation, while the ferrous phosphate cannot be entirely washed free from impurities which tend to favour subsequent coloration of the syrup. The method which I now bring before you is intended to overcome these objections, and has as its main feature *the constant retention of the iron in solution*, thus saving the trouble of precipitating, washing, draining, drying and redissolving a ferrous compound, which is very prone to oxidation. My formula is based upon the quantities given in the official formula and is as follows:—

Take of—

Granulated sulphate of iron	224 grs.
Syrupy phosphoric acid† (sp. gr. 1·500) 9 drachms, 56 grs. by weight.	
Pure carbonate of baryta	159 grs.
Distilled water	6 ozs. or q.s.
Refined sugar	8 ozs.

Mix the phosphoric acid with three ounces of water and in the mixture dissolve the sulphate of iron with the aid of heat; add the baryta carbonate and, when effervescence has ceased, continue the heat for a few

* Read at a Meeting of the North British Branch of the Pharmaceutical Society, Wednesday, December 13, 1882.

† Acid of this density contains, omitting a fraction, 50 per cent. of phosphoric anhydride and the calculation is based upon this percentage. The additional quantity of acid, 76 grs., required to unite with the Fe, to form $Fe_3P_2O_8$, is also included.

minutes, to allow the precipitate to aggregate, then allow to cool. Filter when cold and wash the precipitate with three ounces of cold distilled water; in the filtrate dissolve the sugar without heat and make up to 12 ozs. if necessary.

I may be allowed to give the rationale of the process:—In the first instance, the baryta carbonate will react with phosphoric acid to form baryta phosphate, carbonic acid and water, thus:—

$$2H_3PO_4 + 3BaCO_3 = Ba_3P_2O_8 + 3CO_2 + 3H_2O.$$

Double decomposition will then take place between the iron sulphate and baryta phosphate, thus:—

$$Ba_3P_2O_8 + 3(FeSO_4 7H_2O) = 3BaSO_4 + Fe_3P_2O_8 + 21H_2O.$$

Although baryta phosphate is insoluble in water it is easily held in solution by the excess of acid present. The sulphate, you are aware, is almost insoluble, 1 part only being soluble in 400,000 of water; and it is concluded that it is not more soluble in cold phosphoric acid, but the solubility is rather more at the boiling point. It will be obvious, therefore, that boiling should be prevented, and that the solution be quite cold before filtration; the total separation of the baryta sulphate is thereby secured. To prove this I have several times made an estimation of the precipitate by heating till it ceased to lose weight and weighing: in all cases the theoretical quantity, 188·05 grs., was found; the working loss scarcely interfered with the estimation. In every case I ascertain by the ordinary tests whether the solution contains either undecomposed ferrous sulphate or baryta phosphate previous to the addition of the sugar. The finished product is beautifully transparent and colourless, and infinitely less liable to oxidation than syrup prepared by the official method.

Since writing the foregoing, Mr. MacEwan has drawn my attention to a discussion on this subject at the Pharmaceutical Conference, held in Glasgow. In this discussion Mr. Borland suggested a method based on the same principle which has guided me in drawing up a formula, namely, the precipitation of the sulphuric instead of the ferrous radicle. Mr. Borland gets this result by dissolving lime phosphate in phosphoric acid, and adding a solution of sulphate of iron; double decomposition ensuing. This method is objectionable in so far that lime phosphate to be soluble requires to be freshly precipitated (thus entailing considerable time), and besides the finished product is contaminated with lime sulphate. The objections against the lime phosphate can be obviated by adopting my method and substituting precipitated chalk for baryta carbonate, 81 grains of the former being equal to 159 grains of the latter. If the precipitated chalk be used it is necessary to allow the solution to stand for twenty-four hours to allow sulphate of lime to separate as far as possible. Again, when the sugar has been dissolved in the solution, more lime sulphate separates, due no doubt to its inferior solubility in a saturated saccharine solution; hence the necessity of a few days' rest for deposition.

I am conscious that objections may be urged against the baryta method, lest baryta phosphate should be held in solution by the free acid present; but it is evident that with pure materials, and careful and intelligent manipulation, the process will commend itself as being simpler, speedier and less objectionable than the official method, or than the very slow method of dissolving iron filings in syrupy phosphoric acid.

PRELIMINARY NOTE ON GELSEMINE AND ITS SALTS.

BY A. W. GERRARD, F.C.S.

Up to the present time, that is thirty years after its isolation by Kollock, no crystalline ordinary compounds of the alkaloid gelsemine have been described, although it has been investigated by several chemists, notably, Professor Sonnenschein and Dr. Wormley.

During the year 1881 I prepared a small quantity of gelsemine, having mainly the characters hitherto ascribed to it, only differing so far that microscopic crystals were noticed. This observation was sufficiently interesting to determine me to further investigate the subject, and I have met with considerable success, having prepared the pure alkaloid and a number of its compounds with acids in the crystalline form.

The pure alkaloid is a colourless substance, having properties in many and important respects, especially its behaviour with acids, different from those hitherto described. The hydrochloride and hydrobromide are the best crystallizing salts, their form being prismatic.

In a future paper, and I trust at the next Evening Meeting of the Pharmaceutical Society, I propose to describe in detail the method of preparation and properties of the above compounds. The main object of the present communication is to reserve the right of such work.

THE NEW PHARMACOPŒIAS FOR THE UNITED STATES AND GERMANY.

(*Continued from page* 483.)

Language, Nomenclature, etc.—The text of the new edition of the United States Pharmacopœia is—was as the case in the previous four editions—written in the English language, whilst that of the 'Pharmacopœa Germanica' is entirely in Latin. So strictly is this carried out in the latter work that the German synonyms, which in the first edition were placed under the respective Latin titles, are now remitted to an index at the end of the work. On the other hand, in the United States Pharmacopœia, the titles are given in Latin and in English. It is understood, however, that the adoption of the vernacular tongue in the German work also would have been in accordance with the opinion of the majority of those who carried out its revision, but that in this they were overruled by the Government department, which, indeed, is responsible for the translation into Latin of the original German manuscript presented by the Commission. This decision has given rise to some discontent, and insinuations have not been wanting that it will be necessary to consult the original in some cases in order to understand the newly-coined technical expressions in which the classical philologists have wrapped up the "clear German words." From an international point of view, however, perhaps, even barbarous Latin will, as a rule, be thought preferable to the most crystal German. But, be this as it may, the Imperial Government has thought proper to meet the objectors half-way, and has announced its intention to publish the work in its original German form also, though this is not to be considered the official pharmacopœia.

The *nomenclature* of the United States Pharma-

copœia, in respect to the main principles followed, is the same as that of the previous edition; but in some details it has undergone considerable modification, which, whatever may be the effect in furnishing common ground for agreement at some future time, has the present result of making it less like that of the British Pharmacopœia without making it more like that of the German. For the chemical compounds, the unitary method, advocated by Professor Attfield, is retained, and this method, it has been stated on good authority, will be probably adopted in the next edition of the British Pharmacopœia. But it has been deemed advisable to treat the Latin nouns of salts in *-as* and *-is* as of the masculine gender, on the ground that "the alteration to the feminine gender, made in 1860, was based on error;" *e.g.*, "Calcii Carbonas Præcipitat*us*," "Ferri Sulphas Exsiccat*us*," etc. An argument in favour of this alteration, put forward some time since, was based on the supposed necessity that the adjective should agree with the word "*sal*," understood; but this would seem to involve a further alteration, in which the terminations *-as* and *-is* would disappear altogether. The necessity for the alteration may well be doubted, but it only affects a very few names. A much more important alteration has been made in respect to the names of alkaloids, which in the last edition corresponded with those in the British Pharmacopœia, both in Latin and English. In Latin they are now made to terminate in *-ina*, giving rise to quite a new series of terms—morphina, strychnina, quinina, etc.,—an alteration, which, although advocated by Professor Oldberg, in a paper read before the International Pharmaceutical Congress, hardly appears to present advantages that will compensate for the introduction of another element of confusion in alkaloidal names, especially as in prescriptions the patience of prescribers is hardly equal to the task of writing in full the shorter forms at present in use. On the other hand, the abandonment of the termination *-ia* for the English names, in favour of *-ine*,—for instance, strychnine for strychnia, quinine for quinia,—is a step in the right direction; it being the orthography adopted officially and universally in France, whilst it is in accord with the practical tendency in this country. In Germany, also, where the terminations *-inum* in Latin and *-in* in the vernacular,—which in the United States and Great Britain are confined to the names of neutral principles,—are used for both alkaloids and neutral principles, the adoption of the change would involve only a slight alteration, and one that would be convenient and natural if it were thought advisable in that country to draw an orthographical distinction between the two classes. There are also a few other alterations in the Latin terms of minor importance, some of them tending towards uniformity, and others not. "Glycerina" is abandoned in favour of "glycerinum," the form adopted in the British and German Pharmacopœias; "iodum" takes the place of "iodinum;" "sulphidum" of "sulphuretum;" "cambogia" for "gambogia," etc. 'Manganesium" has been curtailed to "manganum," which is the German official form.

In the 'Pharmacopœa Germanica' the chemical nomenclature has been modified so as to bring it into accord with the principle followed in the United States work, the name of the metal instead of its oxide being now used to indicate the basic portion of a salt. But this affords no approximation to the form adopted in this country and the United tates on the one hand or that in France on the other. "Natrum nitricum" has become "natrium nitricum," "magnesia carbonica" has become "magnesium carbonicum," and so on, but the form remains equally unfamiliar to English eyes. One peculiarity of this nomenclature may, indeed, warrant the repetition of a word of caution. The occurrence of the particle *-at-* in the adjective applying to the non-basic radicle does not indicate that that portion of the compound has anything to do with an acid bearing a name ending in *-ic*, but that it belongs to the haloid class. Thus "ferrum iodatum" does not mean iodate of iron, which has been recently recommended for medicinal use, but our old friend "iodide of iron;" the other class being represented by adjectives constructed on the model of "kalium chloricum" for "potassium chlorate." The "liquor kalii bromati" is, therefore, a solution of potassium bromide, whilst "liquor kalii bromici" stands for the solution of potassium bromate.

Turning again to the United States Pharmacopœia, the rule has been followed, as before, with a few exceptions, of using the botanical genus name of a vegetable drug as its official Latin title; alone, when only one part of the plant is official, but when more than one part is official then the respective parts are indicated. Thus, "sambucus," U.S.P., is equivalent to "sambuci flores," B.P., and "sambuci flores," P.G.; "carum," U.S.P., to "carui fructus," B.P., and "fructus carui," P.G., etc. In the 'Pharmacopœa Germanica' the plan is adhered to, of indicating the part at the commencement of the title, —differing in this from the British Pharmacopœia, —so that the cortices, foliæ, herbæ, radices, etc., occur together in groups. It will, therefore, be apparent from the foregoing, although it may be a minor point, that no great advance has been made towards uniformity in nomenclature.

Arrangement.—In respect to arrangement the United States Pharmacopœia has undergone a great change. Hitherto the materia medica has been kept separate from the preparations and the articles in it have been enumerated in two divisions: a "primary list," which included what were considered to be the more important drugs, and a "secondary list," which included less important drugs and others that were yet on their trial. The plan has had its admirers in this country, but it is open to the objection that the object of a Pharmacopœia is to define medicines rather than to indicate their relative value. It has, however, been abandoned and all the articles of materia medica and preparations are now included in one series, arranged alphabetically. The arrangement, therefore, of the three Pharmacopœias is now practically the same, being subject only to variations arising from differences in the nomenclature. In the United States Pharmacopœia, after the description of each of the crude drugs, are also given the names of the preparations in which it forms a constituent of importance, an addition which, although not carried out so fully as in the British Pharmacopœia, obviates an inconvenience that must have been felt by any person who has had to consult former editions of the American work. In the 'Pharmacopœa Germanica' this plan is not followed.

Descriptions, Chemical Formulæ, etc.—Both the United States and the German Pharmacopœias now differ from the British in omitting processes for

chemical bodies; except in cases where difference in processes produces different results, they are simply described according to their physical characteristics, and tests are given for their identity and purity. This is done very fully in the United States Pharmacopœia, and a large number of solubilities have been added. Definite chemical compounds are represented in the United States Pharmacopœia according to both the old and the new notations. Atomic and molecular weights are also given; but the atomic weights of the elements, which are given to the first place of decimals and are said to have been "selected with care from what appeared to be the most reliable determinations," represent the results of some of the most recent work: aluminium, 27; antimony, 120; bismuth, 210; cerium, 141, etc. The German Pharmacopœia gives neither chemical formulæ nor atomic weights. Temperature is indicated in both the United States and the German Pharmacopœias in degres Celsius; but in the former the equivalents are also given in every case in degrees Fahrenheit. Specific gravities in both works, where not otherwise expressed, are to be understood as taken at 15° C.

Quantities.—The instruction of the Convention to substitute in the United States Pharmacopœia parts by weight (except in certain cases) for actual weights and measures, which was ignored in working out the previous edition, as being then impracticable, has now been effected, and the work has been in this respect brought into accord with the German one. In doing this, care has been taken to adjust the proportions of the new formulæ so as not to affect materially the strength of the preparations. In the case of the pill masses where the quantities of ingredients ordered are for a definite number of pills, they are given side by side in grains and in grams.

Alterations in the Materia Medica and Preparations.—The alterations due to omissions and introductions are in both works very considerable. Taking first the United States Pharmacopœia, the number of articles omitted is 229, consisting of 78 crude drugs (almost all of vegetable origin), 28 inorganic drugs or chemicals, 106 pharmaceutical preparations and 17 miscellaneous substances. Among the dismissed pharmaceutical preparations, etc., are: —2 waters, 3 cerates, 3 confections, 10 decoctions, 2 plasters, 13 solid extracts, 2 fluid extracts, 5 glycerites, 29 infusions, 4 solutions, 5 oils, 2 juices, 3 pills or pill masses, 9 suppositories, 7 tinctures, 7 ointments and 3 wines. The following list of the articles of materia medica omitted will show that whilst a few dismissals are due to the abandonment of processes of manufacture a much larger number are articles of the indigenous materia medica that have become obsolete:—

Acetum.
— destillatum.
Achillea.
Acidum oxalicum.
— phosphoricum glaciale.
— valerianicum.
Aconitia.
Aconiti folia.
Alcohol amylicum.
Aloe barbadensis.
— capensis.
Angustura.
Antimonii oxysulphuretum.
Apocynum androsæmifolium.
Aralia nudicaulis.
— spinosa.
Argentum.
Asarum.
Asclepias incarnata.
— syriaca.
Avenæ farina.
Barii carbonas.
— chloridum.
Berberis.
Bismuthum.
Cadmii sulphas.
Cadmium.
Caffea.
Canella.
Carota.
Carthamus.
Cassia marilandica.
Castoreum.
Cinchona pallida.
Conii folia.
Coptis.
Cornus circinata.
— sericea.
Cotula.
Creta.
Cupri subacetas.
Cuprum ammoniatum.
Curcuma.
Delphinium.
Digitalinum.
Diospyros.
Dracontium.
Elaterium.
Erigeron.
— canadense.
Euphorbia corollata.
— ipecacuanha.
Fermentum.
Ferri ferrocyanidum.
— subcarbonas.
— sulphuretum.
Frasera.
Gentiana catesbæi.
Geum.
Gillenia.
Granati fructus cortex.
Helianthemum.
Helleborus.
Hepatica.
Heuchera.
Hordeum.
Hyoscyami semen.
Iris florentina.
Juniperis virginianus.
Lini farina.
Liriodendron.
Lycopus.
Maranta.
Marmor.
Monarda.
Mucuna.
Nectandra.
Os.
Ovum.
Panax.
Papaver.
Petroselinum.
Polygala rubella.
Quercus tinctoria.
Ranunculus.
Rubia.
Ruta.
Sabadilla.
Sabbatia.
Sago.
Sesamum.
Simaruba.
Solidago.
Spiræa.
Statice.
Tapioca.
Testa.
Tormentilla.
Triosteum.
Uva passa.
Veratrum album.
Vinum portense.
— xericum.
Viola.
Xanthorrhiza.
Zinci oxidum venale.

The newly added articles comprise 30 crude drugs derived from the vegetable kingdom, 60 inorganic drugs or chemicals, 150 pharmaceutical preparations and 16 miscellaneous substances. Among the new pharmaceutical preparations are:— 11 abstracts, 10 solid extracts, 35 fluid extracts, 11 syrups, 22 tinctures and 6 wines. As these preparations will be referred to sufficiently under their respective headings, it will only be necessary, in order to give an idea of the new remedies incorporated in this Pharmacopœia, to give a list of the crude vegetable and inorganic drugs and chemicals that have been added:—

Acidum aceticum glaciale.
— boricum.
— hydrobromicum dilut.
— oleicum.
— phosphoricum.
— salicylicum.
Æther aceticus.
Aluminii hydras.
Ammonii phosphas.
Amyl nitris.
Amylum iodatum.
Antimonii sulphidum pur.
Apomorphinæ hydrochlor.
Argenti iodidum.
— nitras dilutus.
Arnicæ radix.
Auri et sodii chloridum.
Benzinum.
Bismuthi citras.
— et ammonii citras.
Bryonia.
Caffeina.
Calcii bromidum.
Calendula.
Calx sulphurata.
Camphora monobromata.
Carbonei bisulphidum.
Caulophyllum.
Chelidonium.
Chinoidinum.
Chysarobinum.
Cinchonidinæ sulphas.
Cinchonina.
Codeina.
Cupri acetas.
Elaterinum.
Erythroxylon.
Eucalyptus.
Fel bovis.
— inspissatum.

Fel purificatum.
Ferri carbonas saccharatus.
— iodidum saccharatum.
— oxidum hydratum cum magnesia.
— sulphas præcipitatus.
— valerianas.
Frangula.
Glycyrrhizinum ammoniat.
Grindelia.
Guarana.
Hamamelis.
Hyoscyaminæ sulphas.
Illicium.
Lithii benzoas.
— bromidum.
— salicylas.
Magnesia ponderosa.
Magnesii citras granulat.
— sulphis.
Maltum.
Menispermum.
Mucilago cydonii.
Oleatum hydrargyri.
— veratrinæ.
Oleum adipis.
— aurantii cortices.
— aurantii florum.
— coriandri.
— eucalypti.
— gossypii seminis.
— lavandulæ florum.
— myrciæ.
— phosphoratum.
— picis liquidæ.
— santali.
— sinapis volatile.
Opii pulvis.
Opium denarcotisatum.
Pepsinum saccharatum.
Petrolatum
Physostigminæ salicylas.
Picrotoxinum.
Pilocarpinæ hydrochloras.
Pilocarpus.
Piperina.
Pulsatilla.
Quillaia.
Quinidinæ sulphas.
Quinina.
Quininæ bisulphas.
— hydrobromas.
— hydrochloras.
Resina copaibæ.
Rubus idæus.
Salicinum.
Sapo viridis.
Sodii benzoas.
— bisulphis.
— bromidum.
— chloras.
— iodidum.
— pyrophosphas.
— salicylas.
— santoninas.
— sulphocarbolas.
Staphisagria.
Sumbul.
Thuja.
Thymol.
Triticum.
Ustilago.
Viburnum.
Vinum album.
— album fortius.
— rubrum.
Viola tricolor.
Vitellus.
Zinci bromidum.
— iodidum.
— phosphidum.

The net result of the omissions and additions in respect to the number of articles in the United States Pharmacopœia is an increase of 27, the total number of titles in the present edition being 997.

The Pharmacopœa Germanica, on the contrary, has undergone a decrease of about one-third, for whilst 360 articles have been omitted, only 48 new ones have been inserted. Amongst the articles of the materia medica that have been omitted are the following:—

Aconitinum.
Æther petrolei.
Alumina hydrata.
Ammonium phosphoricum.
Amylum marantæ.
Atropinum.
Aurum foliatum.
Balsamum tolutanum.
Bismuthum valerianicum.
Cadmium sulphuricum.
Carboneum sulphuratum.
Caricæ.
Castoreum sibiricum.
Chininum.
— tannicum.
— valerianicum.
Chinoidinum.
Cinchoninum.
— sulphuricum.
Coccionella.
Colla piscium.
Conchæ præparatæ.
Coniinum.
Cortex fructus juglandis.
— mezerei.
Cuprum aceticum.
— aluminatum.
— subaceticum.
Dextrinum.
Elemi.
Faba calabarica.
Farina hordei præparata.
Fel tauri.
Ferrum chloratum.
— citricum ammoniatum.
— citricum oxidatum.
— oxidatum fuscum.
— phosphoricum.
Flores aurantii.
— chamomillæ romanæ.
— malvæ arboræ.
— millefolii.
— primulæ.
— rhœados.
Folia aurantii.
— laurocerasi.
Folia rosmarini.
— rutæ.
— toxicodendri.
Fructus anisi stellati.
— cannabis.
— ceratoniæ.
— coriandri.
— myrtilli.
— petroselini.
— sabadillæ.
Fungus laricis.
Gelatina.
Herba chenopodii ambrosioides.
— galeopsidis.
— gratiolæ.
— lactucæ.
— linariæ.
— majoranæ.
— millefolii.
— polygalæ.
— pulsatillæ.
— spilanthis.
Hydrargyrum sulphuratum nigrum.
— sulphuratum rubrum.
Kino.
Lignum campechianum.
Macis.
Magnesia lactica.
— usta.
Manganum hyperoxydat.
Manna.
Mastix.
Mel.
Morphinum.
— aceticum.
Natrum pyrophosphoricum.
— santonicum.
— subsulphurosum.
Oleum animale æthereum.
Oleum aurantii corticis.
— bergamottæ.
— chamomillæ æthereum
— majoranæ.
— menthæ crispæ.
— phosphoratum.
— sabinæ.
— succini.
— valerianæ.
Olibanum.
Radix alkanæ.
— arnicæ.
— artemisiæ.
— asari
bardanæ.
— belladonæ.
— carlinæ.
— hellebori viridis.
— pyrethri.
— saponariæ.
— scammoniæ.
— serpentariæ.
Resina draconis.
— guaiaci.
— pini.
— scammoniæ.
Rhizoma caricis.
— chinæ.
— curcumæ.
Sandaraca.
Semen cydoniæ.
— quercus tostum.
— stramonii.
Stipites dulcamaræ.
Strychninum.
Succinum.
Sulfur iodatum.
Zincum ferrocyanatum.
— lacticum.
— oxydatum sulfocarbolic
— valerianicum.

The dismissal of the above substances involves the omission also of a large number of their derivatives, and these are augmented by many antiquated preparations that are now dropped out. Amongst these are:—2 vinegars, 27 waters, 5 cerates, 16 plasters, 27 extracts, 8 liquors, 4 powders, 3 soaps, 4 spirits, 10 syrups, 22 tinctures, 4 troches and 22 ointments.

The additions are as follows:—

Acidum carbolicum liquef.
Acidum formicicum.
— pyrogallicum.
— salicylicum.
Aluminium sulfuricum.
Ammonium bromatum.
Amylium nitrosum.
Apomorphinum hydrochl.
Aqua carbolisata.
Calcium phosphoric. crud.
Charta sinapisata.
Chrysarobinum.
Cortex condurango.
Folia jaborandi.
Gossypium depuratum.
Hydrargyrum cyanatum.
Kalium bichromicum.
Linimentum terebinthinat.
Liquor aluminii acetici.
— corrosivus.
— ferri oxychlorati.
— natrii silicici.
Manganum sulfuricum.
Natrium benzoicum.
Natrium bromatum.
— iodatum.
— salicylicum.
Oleum cantharidatum.
— olivarum commune.
— rapæ.
Paraffinum liquidum.
— solidum.
Pepsinum.
Physostigminum salicylic.
Pilocarpinum hydrochloric.
Plumbum aceticum crud.
Podophyllinum.
Pulv. salicylicus c. talco.
Resina dammar.
Sal carolinum factitium.
Sapo kalinus.
Species lignorum.
Spiritus vini cognac.
Talcum.
Thymolum.
Tinctura veratri.
Unguentum paraffini.

(*To be continued.*)

A PROCESS FOR COATING PILLS WITH GELATINE.*

BY CLAY W. HOLMES.

Much has been written on the preparation of gelatine-coated pills, and various contrivances have been made and offered to pharmacists, protected by patents, and at an exorbitant price, so that few attempt the extemporaneous preparation of coated pills. Like all other manipulations in the laboratory, the coating of pills requires some experience, yet a reasonable amount of practice and patience will enable any pharmacist to devise means by which, at a minimum outlay, he can make a pill equal in appearance to those offered by the large manufacturers. It is the writer's desire to lay out the practical points in such a manner that any one can proceed intelligently, and without difficulty. The first point which presents itself is the pill to be coated. Pills composed entirely of dry powders offer little difficulty. Those containing a large proportion of extracts may occasion trouble. Much depends upon the excipient employed. Simple syrup is the best whenever it will make the mass sufficiently adhesive. In case this fails, confection of rose, or ext. gentian may be employed. Glycerine should never be used. If the mass is too soft, owing to the presence of a large portion of extract, stiffen it with sugar of milk or powdered gum arabic. The mass having been carefully prepared, the pills may be made either oval or spherical. The writer prefers the oval.

In making granules of arsenious acid, strychnia or other active remedies requiring minute doses, add enough sugar of milk to give the desired size, and make the mass with simple syrup. The pill being properly made, the next point is the apparatus for coating. The writer has made use of a round tin cup, about three (3) inches in diameter, in appearance like an ordinary blacking-box cover. The needles used were "No. 1 sharps,' 'ordinary make. A thin layer of paste of plaster of paris and water is poured into each cup, and the needles set in the plaster. Each cup will hold twenty-five (25) needles. Place one in the centre, and around that run two circles—the first, half the distance between the centre and the edge of the cup; this circle to contain eight (8) needles. The outer circle, within one-eighth (1-8) of an inch of the edge; this circle contains sixteen (16) needles. If the distances are properly divided the needles will be far enough apart to hold the largest pill without fear of contact. After the plaster has set make more paste, thin enough to pour, then fill the cup. Let it stand until the plaster is firm, and then the cup is ready for use. The pills are readily stuck on the needles by hand, transfixing them as lightly as possible. The pill is now ready for coating. The coating solution is prepared as follows:—

℞ Gelatine, French (gold label) . . .	℥iv.
Gum arabic	℥j.
Sugar	℥j.
Water	q. s.

Dissolve the gum arabic and sugar in eight (8) ounces of hot water in a capsule by means of a water-bath. Then add the gelatine and stir it until dissolved, Should the water have evaporated to such an extent that the solution is apparently too thick, add water gradually until it has the consistency of hot syrup. Continue the heat until a pellicle forms on the surface, then pour into a cold dish. A sixteen (16) ounce porcelain-covered casserole, with handle and lip, is a convenient dish to use, or a tin vessel may be made use of, a pint cup with a lip being about the size. Let the solution stand until the temperature is somewhat lowered, stir up the solution to break pellicle, and then dip the pills into the solution, lowering carefully until completely immersed. Pull them out slowly, that the surplus gelatine may run off, and then bring the needles to a horizontal position and rotate slowly for half a minute, when the cup may be set down. As soon as the coating is sufficiently set to prevent adhering to the fingers when touched, the pills are ready to come off.

Take an alcohol lamp with a small flame, and let the needle strike the flame about ½ inch from the pill. As soon as the needle is heated the gelatine begins to swell. Twist the pill off carefully, before the needle gets sufficiently hot to soften the pill, and with the finger stop the hole while the gelatine is hot. The pill is then ready to dispense.

If it is intended to keep the pills in stock they should be exposed to the air for a few hours before bottling. After the process is finished pour the coating solution into a wide-mouth pint bottle, and when cold pour on sufficient alcohol to make a strata ½ inch deep on the surface of the gelatine, and cork tightly. In this way the gelatine will keep for any length of time. When necessary to use again pour off the alcohol into a smaller bottle (kept ready for that purpose), place the gelatine bottle in a ½ gallon tin measure, putting a large piece of cork in the bottom to protect the bottle from direct heat, fill the measure nearly to the neck of the bottle with cold water and put over the gas flame or on the stove. Continue the heat until the gelatine is thoroughly liquified, and then pour into the coating-dish previously used. Place the empty bottle in the measure to keep it hot. As few or as many pills as you wish may be coated, and then the solution at once returned to the bottle. After the pills have been removed from the needles the next consideration is to restore the needles to their original condition.

A tin pan, or any convenient vessel having a flat bottom, is filled to the depth of an inch with hot water, and the cup is set in, the points being placed downward, the water not being deep enough to reach the cup. As soon as the gelatine is soft take the cup out, and with a small notched stick push the gelatine bulbs off, and then plunge the points into a bag of coarse emery a few times. This polishes the needles, and they are then laid aside until wanted again.

The only points of difficulty in the process, to the average pharmacist, will be the making of the pill and the proper consistence of the coating solution. Both must be learned by experience. If the coating is too thin on the pill, or does not cover it perfectly, evaporate the solution somewhat. Should it form too thick a coat, add a little hot water, and stir well. A pellicle forms rapidly, and it is necessary to stir frequently to prevent the pellicle from adhering to the pills as they are drawn out of the solution.

The difficulty in regard to the consistence of the pill shows itself in the bursting of the coating, and the exudation of the mass, when too soft, as is often the case in pills made largely from solid extracts. To remedy this, the mass must be made harder by the addition of gum arabic, or some other inert powder. Like all other labours in the laboratory, this process is open to the prospect of failure unless some degree of patience is exercised. The general working points are simple, the process does not require any elaborate machinery or contrivances, which might open a legal question as to "rights of protection," and anyone can, without fear of trouble, prepare for himself the simple apparatus described in this paper, and make any pills for which he may have a demand.

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RESEARCHES ON TARCHONANTHUS CAMPHORATUS.*

BY F. CANZONERI AND G. SPICA.

This plant, belonging to the Composite order, sub-order *Asteroïdeæ*, is indigenous at the Cape of Good Hope. On exhausting its dried leaves with warm alcohol in a percolator, and leaving the alcohol to cool, a greenish-white

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gelatinous substance is deposited, which may be purified by washing it on a filter with alcohol as long as the filtrate exhibits a green colour, then drying it in the air, twice crystallizing it from alcohol, washing the waxy substance thus obtained with ether, and finally crystallizing it from alcohol.

The substance thus purified crystallizes in white light scales, having a silvery lustre, melting at 82°, solidifying at a slightly lower temperature, and afterwards melting at 72°. It is tasteless, burns with a bright flame, leaving no residue, and emitting the characteristic odour of burnt wax. It is insoluble in water, slightly soluble in cold, freely in hot alcohol; not attacked by strong sulphuric or hydrochloric acid or by strong potash-ley, and not sensibly altered by fusion with potash. Its analysis gave, as a mean result, 83·66 per cent. carbon and 14·44 hydrogen, and the chloride obtained by treating it with phosphorus pentachloride gave 80·77 per cent. C, 11·12 H and 4·17 Cl. These results, together with the resistance of the substance to the action of melting potash, lead to the idea that it might be a higher homologue of myricyl alcohol, $C_{32}H_{66}O$, which is also unattacked by potash; if so it must contain 50 or more atoms of carbon, and might be represented by either of the formulæ, $C_{50}H_{102}O$, $C_{51}H_{104}O$, $C_{52}H_{106}O$. The corresponding chloride melts at 67° to 68°; myricyl chloride at 64·5°.

It is not yet decided whether this alcohol, which the authors propose to call tarconyl alcohol, exists in the leaves in the free state or is produced by the action of the alcohol used in its preparation on a wax contained in the leaves. The solution from which the alcohol has been separated yields on evaporation a heavy, dark-coloured, pungent oil, consisting for the most part of an ether of an aromatic acid not yet examined.

ATOMS AND MOLECULES.*

BY BARNARD S. PROCTOR.

(*Continued from page* 486.)

In the various alcohols we have a step by step increase in complexity of molecular structure, with a like increase in density and decrease in mobility; at the same time we find the light mobile alcohols miscible with water in all proportions, the heavy alcohols insoluble in water but soluble in oils; the light alcohols standing between water and the heavy alcohols, and having considerable intersolubilities with both.

The molecular motions and polarities of water are probably considerably influenced by most substances which may be dissolved in it, especially in those cases where one body has a conspicuous influence on the solubility of another, with which it does not enter into combination or decompose. Such, for example, as ammonia, which when present in large proportion has power to throw out of solution the double sulphate of copper and ammonia. The molecular relationships of the water are evidently much influenced by the great affinity of the ammonia; they are also much influenced, though in a different direction, by the great affinity of carbonate of potash when added to saturation, the saturated solution not being miscible with a strong solution of ammonia. On the other hand the sparingly soluble bodies probably have their molecular movements and polarities comparatively little influenced by the water, as in the case of hydrogen and oxygen, which may both be dissolved in water, though only to a small extent, and yet not enter into combination with one another. We regard the liquid condition as that most favourable to the combination of bodies having a tendency to unite, and yet the great affinities of O and H fail to bring them into union. Probably the affinity between the water and these two gases is so small as to exert very little influence on their movements, and leave them virtually in the free and gaseous state, occupying as it were only the interstices of the water. The case is necessarily different with ammonia, where the proportio is so great that we cannot suppose it to retain a molecular condition or mobility in any degree approaching that of its gaseous state. And the case is also very different when O and H are condensed upon the surface of platinum, where the amount of condensation is so great as to preclude the idea of a truly gaseous condition of the molecular movements, and where the affinities are brought into effective play. The great affinity of ammonia for water is seen not only in its abundantly taking the liquid form by their union, but also by its power to throw the carbonate of potash out of solution, when passed in the gaseous state through a saturated solution of this salt. Ammonia very much diminishes the solvent power of water for many other salts, but has no appreciable action on the solubility of ether, chloroform, sugar or gum.

I am not prepared to suggest any more definite relation between a substance and its solvent, than a harmony of molecular movements, and the existence of molecular polarities acting between the solid and the solvent, which enable the movements of the solid to throw off molecules under the influence of the motions and polarities of the solvent, with rates of frequency peculiar to the solid and solvent under consideration, and allow the re-attachment of the molecules of the solid to one another when the number of molecules of the solid to those of the solvent is beyond a ratio peculiar to themselves.

I think there is every reason to believe that the polarities of crystalline bodies by their inequalities cause the set of the matter in the crystalline form. I think there is also probability, though not yet so strong, that in amorphous or less crystalline bodies the intensities of the molecular polarities are more equal, and that bodies which are capable of taking both forms have polar intensities differing to so small an extent that a slight change of circumstances may determine the orderly or the heterogeneous arrangement of their molecules. It would be reasonable if such were the case, that the amorphous condition should be the less resistant to mechanical or chemical change, *i.e.*, should be softer, more soluble, more prone to enter into chemical combination. To illustrate my meaning, some substances may be thrown down as amorphous precipitates, becoming crystalline by time; the polarities being weak or of nearly equal strengths, the molecules attach themselves together in heterogeneous contact of those points which were nearest at the time of the formation of the new compound, and, being thus less combined, they are more readily dissolved by the mother-liquor. But some crystalline particles get formed, and are always surrounded by mother-liquor holding in solution more than the normal proportion of the salt. The crystalline particles are, therefore, always in circumstances to grow in size by attachment of more molecules drawn to them by the crystalline polarity; this reduces the solution to a strength below that at which it is capable of taking up the amorphous salt. The crystalline part of the precipitate is thus always growing, and the amorphous is constantly being dissolved till all has become crystalline. The whole phenomenon is very beautifully seen by aid of the microscope in the process for detecting traces of strychnine by precipitation with ferricyanide of potassium.

A drop of solution of strychnine on the microscope slide, being touched with a minute fraction of a drop of a solution of the ferricyanide, and the precipitate immediately examined under a half-inch objective, shows an amorphous cloud which quickly commences to exhibit a few crystals of a beautiful star-like shape. Around these the nebulous precipitate rapidly dissolves, leaving a clear space into which the stars expand, while the clouds clear away till all is bright and beautiful. Unless care be taken, it is sometimes difficult to repeat this experiment, as a trace of crystalline salt determines the rapid

* Presidential Address delivered before the Newcastle-upon-Tyne Chemical Society.

and less regular crystallization of the whole precipitate at once.

In this and many other cases the substance is capable of taking either of the two conditions distinctly. There are many in which a precipitate is apparently amorphous, though probably only so in appearance, from being in too minute a condition for its crystalline form to be noted under the microscope, and a considerable number of bodies exist in which no trace of crystalline property has yet been discovered, the most perfect of these being the gelatinous or colloid bodies.

The gelatinous state itself is probably due to polarities in the molecules acting equally in all directions. The hydration of colloid bodies has always appeared to me to be a subject worthy of speculation and of experiment. Its study relates to a debateable condition between the solid and the liquid state. We can trace every degree of change without any clear separation, from the most perfect fluidity through a great variety of watery combinations to the most perfect solidity and the most perfect insolubility, without losing the connection between the water and the solids with which it is brought into operation.

There is the most perfect gradation from the solution of ammonia, which is lighter and more mobile than water itself, through the solutions of crystalloid solids which add but little to the viscosity of the water, to solutions which are syrupy, to solutions of gums which are mucilaginous fluids or gelatinous semi-fluids, to combinations of water with gelatine or albumen, which by change of temperature become fluid in one case or lose fluidity in the other; to silica, which may be precipitated as a transparent gelatinous mass from a dilute solution, or as a pulverulent and opaque precipitate from a concentrated liquor, to clay which in small quantity remains diffused through pure water, with a persistency suggesting a union approaching that of solution, and from which it may be precipitated by hydrochloric acid, and to clay in its plastic state which presents some analogies to hydrated colloids; thus through many links till at the end of the chain we come to pure silicious sand and other pulverulent bodies, which retain the one remnant of analogy to solubility, that they are always left in a more coherent state by evaporation of water in which they have been immersed, than by lying in dry contact during any observable time.

I cannot at present enlarge upon more than one or two of the many suggestive links which merit study in this chain, first, as to the great force (molecular polarity I will assume) by which the gelatinous colloids are held together, and how great a force is represented by their union with water, and then to the adhesion, or cohesion of precipitates on the evaporation of water in comparison to the adhesion of the same substances under dry pressure. As regards the coherence of gelatinous colloids glue affords a convenient illustration. One part of gelatine dissolved in 100 of hot water makes a jelly on cooling. One molecule of gelatine confers proximate solidity to 100 times its weight of water; the molecules of gelatine may be regarded as separated from one another by this large proportion of water intervening, and still to have so much hold upon one another—still to be so strongly under the influence of one another's polarities, that they are held in position and not free to move, though the jelly is tremulous and easily broken. We might expect the polarities to increase inversely as the squares of the distances of the molecules, and to become something considerable as the water is diminished, and this is the fact to a larger extent than is often supposed. A solution of gelatine evaporated in glass or porcelain vessels contracts so much, and with so much force, as to tear away the surface of the vessel, thus indicating that the molecular attraction of the gelatine is at least as great as that of glass or porcelain. I have here specimens of glass and porcelain thus fractured. I had long ago heard of such results, but heard of them with a reservation of faith, till a few years ago, when experimenting with gelatine, my beaker fell a victim to this adhesive, cohesive, and contractile force. The effect on the evaporating dish is equally interesting. The force evidently exceeds the tensile strength of glass and porcelain, and if measured by pounds per square inch must be something considerable; but probably all the molecular forces would be large—indeed ungovernably violent, if our engineers were reduced to the size of molecules.

If the molecules of gelatine are held together with this great force, the force with which water attacks them must be equally great to enable it to penetrate the gelatine on immersion and expand it as it does. The swelling of a substance by becoming damp is frequently spoken of as the result of capillary attraction. I believe, however, that in most cases, if not in all, where swelling action takes place, it is the result of colloid hydration rather than capillarity. It is worthy of a passing remark, that while gelatine diffuses to a small extent only in water, water penetrates to a large extent into gelatine, and in contrast to this crystalloids diffuse freely in water, but water does not penetrate into a mass of solid crystalloid, though it diffuses into a solution of the same.

Turning now to another point, which I can do no more than touch upon, we may take pure silicious sand and wash it with the greatest care in distilled water, finally decanting the water and drying a small quantity of the sand in a beaker by evaporation. The particles of sand adhere to one another and to the beaker with sufficient force to permit of the inversion of the beaker without the sand falling out, though, if once disturbed after it has become dry, the adhesion instantly disappears, and does not show itself again after a long period of rest in the dry state. What is the nature of this adhesion, and what part the water takes in bringing it about is, as yet, problematical. We note the same effect in all bodies in varying degrees, from gelatine down to sand; it is not proportionate to the solubilities of the bodies in which it takes place. No doubt solubility has an effect of this kind, but we cannot regard the phenomenon as simply dependent on partial solution and the cementing of the undissolved particles, by means of the dissolved portion, left as a residue on evaporation.

The effect is variable in amount among bodies nearly equally soluble—for example, sand and clay—sand having the loosest possible adhesion, and clay a considerable one. It is more likely that the superficial molecules in a particle of sand or clay have one side of the molecule free to exert an affinity on the water, and that one side of the molecule is thus in the condition of hydration, the difference being that in hydrated colloids both sides of the molecule have water attached, and the action extends to every molecule in the mass. On this supposition when the water is evaporated, adhesion should take place wherever two molecules of silica come in contact, and the amount of adhesion should be proportionate to the relation between the size of the particles and the size of the molecules.

In a very interesting paper on regelation and the uniting of powders into masses under pressure, Professor Spring notices incidentally the disposition of powders, kept in bottles undisturbed for a length of time, to become united into masses which are more or less strongly coherent as they have been undisturbed for a longer or shorter time, and he attributes this result to a disposition possessed by most substances, but he thinks by crystalline substances especially, to weld when submitted to pressure —to unite promptly and perfectly under powerful pressure, or slowly and imperfectly under the pressure of their own weight. That many powders do agglomerate in our bottles is well known to us all, but the cause of their agglomeration I should think is mainly due to the action of moisture and change of temperature. The tendency to absorb moisture is not confined to deliquescent sub-

stances, or to substances commonly known as hygroscopic, but is probably possessed by all matter which has been carefully dried. In non-deliquescent salts the absorption of moisture ceases before the salt becomes palpably moist, but not before the particles are coated with an infinitesimal film of saturated solution of the salt. This film increasing in moist states of the air, and evaporating under the reverse circumstances, is sufficient to cause the agglomeration of the powder by a species of crystalline soldering of one particle to another. The same result would be produced by changes of temperature increasing or diminishing the solubility of the salt in its watery film. There is scope here for a series of careful observations which could not fail to be instructive. Professor Spring's results have had a great interest for me, perhaps the more so, as his conclusions are in some points opposite to my prejudices. He thinks that softness and a crystalline nature are, if not essential, at least favourable to this welding by pressure, Some years ago when Professor Brayley was lecturing on Physical Geography to our Literary and Philosophical Society, I performed for him an experiment in regelation, in illustration of his remarks upon glaciers, the point being the uniting of two pieces of ice while immersed in warm water. He expressed to me his conviction that it would ultimately turn out that regelation or welding could only take place with the matter in a colloid state. That ice, though crystalline in freezing, was probably colloid in melting, that iron, though feebly crystalline while cold, became colloid at a welding heat, and so on. He did not consider these points sufficiently mature for publication, but we discussed them as matters of interest to be kept in view as the subject of regelation and welding might develope, and I must say I felt strongly inclined to his view. I anticipated that the condition of matter which facilitated welding—using the word in a wide sense—was the reverse of that which is most favourable to, and most characteristic of, crystallization. My idea of crystalline matter was that the molecules had such polarities as caused their arrangement in a regular crystalline form, and the molecules would have little or no tendency to unite unless presented to one another in the position of this normal arrangement, and that colloid bodies consisted of molecules which cohered together in obedience to polarities which were not selective in their action, but which would cause the molecules to unite and cohere in any position or arrangement: and that welding or cohesion should take place when, by mechanical means, the masses can be brought together as closely as are the molecules within the masses. On this supposition welding should be a general property of such amorphous bodies as are soft enough to admit of their surfaces yielding so as to adapt themselves perfectly to one another. Practically, however, we had only a very limited experience of this till Professor Spring announced the success which he had achieved in uniting a great variety of powders by submitting them to pressures varying up to 20,000 atmospheres. I repeated a number of his experiments, and added others, and have now the pleasure of laying before you a few typical examples of the results. I had intended embodying, in the present address, some account of these experiments, but I find time will not permit me to do so at present, though it is possible I may find another opportunity of giving you a few details.

If we take a comprehensive view of welding, it is evident (without recourse to Professor Spring's experiments) that it accompanies a soft or semi-fluid condition rather than either a crystalline or colloid nature. The running together of two dew drops on the petal of a flower is the same thing in principle as the union of zinc filings under the pressure of 10,000 atmospheres in Professor Spring's apparatus, or the welding of the coils of a 100-ton gun in Sir W. G. Armstrong's works. Solidity and fluidity are but the different parts of an unbroken chain. The dew drop on a rose retains its rotundity against the force of gravity, in obedience to the greater force of its molecular attractions. On the other hand, the molecular attractions of the metal, great as they are, yield to the greater force of mechanical pressure, and zinc flows under the force of 10,000 atmospheres, or iron welds under the combined forces of the furnace and the forge. The probability is that all things would weld under circumstances such as would make them flow; that is, the molecular forces within the mass must be reduced or the external forces must be increased till the latter are at least equal to the former.

Pharmacists have long been familar with the welding tendency of powdered camphor, aloes, and other soft bodies of either a crystalline or amorphous nature. I should have felt considerable surprise if there had been a general difficulty in causing the welding of amorphous or colloid bodies, and among the first experiments I tried, after ascertaining that I could really obtain Professor Spring's general results, were those to determine the welding powder of sundry familiar colloids. Gums, sugar, gelatine, resins, and amorphous salts were tried with the general result that the amorphous bodies unite in a very similar degree and manner to the crystalline.

Amorphous sugar welds rather more easily and rather more perfectly than crystalline sugar under the same pressure. With crystalline and amorphous chrome alum there was no appreciable difference. The double citrate of ferric oxide and ammonia, though an amorphous salt, unites perfectly and readily; so does the double sulphate of the same bases which is a crystalline alum.

Though I have ceased to believe with Brayley that the colloid condition is an essential preliminary to a good weld, I have not learned to think with Spring that it is less favourable than the crystalline state; a definite judgment upon this point must be reserved for a much more extended evidence.

Professor Spring has obtained several other results no less interesting; he has shown that sulphur, in whatever condition it is put into the press, assumes its densest condition under pressure. Whether amorphous or prismatic in the first instance, it becomes octahedral by compression. Thus pressure is capable of producing molecular change, and the allotropic condition which is possessed of the greatest density. He has also submitted a mixture of copper filings and sulphur to a pressure of 5000 atmospheres, and obtained a block of sulphide of copper, showing that the pressure which suffices to cause the welding together of the particles of sulphur, or the particles of metal if applied to them separately, has the power of facilitating their chemical union if applied to them when mixed; but he thinks that such chemical union only takes place when the resulting compound occupies less space than the two elements in the separate state. In illustration of this I have upon the table a little block obtained by the same treatment of a mixture of sulphur and powdered tin, in which mechanical union and cohesion have been obtained, but not chemical union, the sulphur being still visible with the aid of a lens. There is here a resistance to blending, which we may compare to the immiscibility of oil and water, or to the aqueous solutions of ammonia and carbonate of potash previously noted, a resistance which we may suppose to be due to a want of harmony in the molecular movements of the bodies concerned, a discordance which is not removed by pressure such as we can apply, but which is removed by an increase in temperature. We may suppose the discordance to be similar to that of phosphorus and oxygen in the cold, where the union is retarded by pressure, and expedited by the reduction of pressure, or the increase of temperature. If the molecular movements of two elements in the separate state take place in one plane, the composition of these motions may result in a motion occupying more space, less space, or the same space as that occupied by the sum of the original elementary motions, but if the elementary motions are in different planes the result is a movement occupying more space than the sum of the previous movements. Under

these circumstances there is a natural obstacle to this composition of forces, if the elements are brought together in a space too small to allow of the resultant motion. This is probably another way of putting the conclusion at which Professor Spring had arrived, *i.e.*, that combination takes place when the resulting compound has a greater density than the mean of the two elements, and does not take place if the density is less than the mean.

(*To be continued.*)

THE UNITED STATES PHARMACOPŒIA SYRUPS.

The following formulæ are taken from the new edition of the United States Pharmacopœia:—

Syrupus Calcii Lactophosphatis.

Syrup of Lactophosphate of Calcium.

Precipitated phosphate of calcium, *twenty-two parts*	22
Lactic acid, *thirty-three parts*	33
Orange flower water, *eighty parts*	80
Sugar, in coarse powder, *six hundred parts*	600
Hydrochloric acid,	
Water of ammonia,	
Water, each, *a sufficient quantity*,	
To make *one thousand parts*	1000

To the precipitated phosphate of calcium, mixed with *three hundred* (300) *parts* of cold water, add enough hydrochloric acid to dissolve it. Filter the solution, dilute it with *twelve hundred* (1200) *parts* of cold water, and then add water of ammonia, until it is slightly in excess. Transfer the mixture at once to a fine, wetted muslin strainer. As soon as the liquid has run off, return the magma to the vessel, mix it quickly with *twelve hundred* (1200) *parts* of cold water, and again transfer it to the strainer. When it has drained, mix the magma at once with the lactic acid, and stir until it is dissolved. Then add the orange flower water and enough water to make the solution weigh about *three hundred and fifty* (350) *parts*, filter, and pass enough water through the filter to make the filtrate weigh *four hundred* (400) *parts*. Lastly, add to this the sugar, dissolve it by agitation, without heat, and strain.

Syrupus Ferri Bromidi.

Syrup of Bromide of Iron.

A syrupy liquid containing 10 per cent. of ferrous bromide [$FeBr_2$; 215·5.—*FeBr*; 107·75].

Iron, in the form of fine wire, and cut into small pieces, *thirty parts*	30
Bromine, *seventy-five parts*	75
Sugar, in coarse powder, *six hundred parts*	600
Distilled water, *a sufficient quantity*,	
To make *one thousand parts*	1000

Introduce the iron into a flask of thin glass of suitable capacity, add to it *two hundred* (200) *parts* of distilled water and afterwards the bromine. Shake the mixture occasionally, until the reaction ceases and the solution has acquired a green colour and has lost the odour of bromine. Place the sugar in a porcelain capsule and filter the solution of bromide of iron into the sugar. Rinse the flask and iron wire with *ninety* (90) *parts* of distilled water, and pass the washings through the filter into the sugar. Stir the mixture with a porcelain or wooden spatula, heat it to the boiling point on a sand-bath, and having strained the syrup through linen into a tared bottle, add enough distilled water to make the product weigh *one thousand* (1000) *parts*. Lastly, shake the bottle and transfer its contents to small vials, which should be completely filled, securely corked, and kept in a place accessible to daylight.

A transparent, pale green liquid, odourless, having a sweet, strongly ferruginous taste, and a neutral reaction. With test-solution of ferricyanide of potassium it yields a blue precipitate. If a little disulphide of carbon be added to the syrup, then a few drops of chlorine water, and the whole agitated, the disulphide will separate with a yellow or brown colour. It should not deposit a sediment on keeping, and should not tinge gelatinized starch yellow (abs. of free bromine).

Ten gm. of the syrup should require for complete precipitation not less than 1·57 gm. of nitrate of silver (corresponding to 10 per cent. of ferrous bromide).

Syrupus Ferri Quininæ et Strychninæ Phosphatum.

Syrup of the Phosphates of Iron, Quinine, and Strychnine.

Phosphate of iron, *one hundred and thirty-three parts*	133
Quinine, *one hundred and thirty-three parts*	133
Strychnine, *four parts*	4
Phosphoric acid, *eight hundred parts*	800
Sugar, in coarse powder, *six thousand parts*	6000
Distilled water, *a sufficient quantity.*	
To make *ten thousand parts*	10000

Add the phosphate of iron to *twenty-five hundred* (2500) *parts* of distilled water, in a tared bottle large enough to hold the finished syrup, and agitate frequently until the salt is dissolved. Having added the phosphoric acid to the solution, triturate the quinine and strychnine gradually with the mixture, in a mortar, until they are dissolved, then return the solution to the bottle and add enough distilled water to make the liquid weigh *four thousand* (4000) *parts*. Lastly, add the sugar, dissolve it by agitation, without heat, and filter through paper.

Keep the syrup in small, well-stopped vials, in a cool and dark place.

Syrupus Hypophosphitum.

Syrup of Hypophosphites.

Hypophosphite of calcium, *thirty-five parts*	35
Hypophosphite of sodium, *twelve parts*	12
Hypophosphite of potassium, *twelve parts*	12
Citric acid, *one part*	1
Spirit of lemon, *two parts*	2
Sugar, in coarse powder, *five hundred parts*	500
Water, *a sufficient quantity*,	
To make *one thousand parts*	1000

Mix the hypophosphites, and dissolve them, by trituration, in *three hundred and fifty* (350) *parts* of water. Should there be a trifling residue undissolved, allow the solution to settle, pour off nearly all of it, and add the citric acid, so that the residue may be dissolved. Then, having mixed the liquids, add the spirit of lemon, and filter through paper, adding through the filter enough water to make the whole weigh *five hundred* (500) *parts*. In this liquid dissolve the sugar, by agitation, without heat, and strain.

Keep the syrup in well-stopped bottles.

Preparation: Syrupus hypophosphitum cum ferro.

Syrupus Hypophosphitum cum Ferro.

Syrup of Hypophosphites with Iron.

Lactate of iron, *one part*	1
Syrup of hypophosphites, *ninety-nine parts*	99
To make *one hundred parts*	100

Dissolve the lactate of iron in the syrup by trituration.

Keep the syrup in well-stopped bottles.

The Pharmaceutical Journal.

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RHEUM OFFICINALE.

TEN years have now passed away since there appeared in the pages of this Journal the first printed account of a species of *Rheum*, which Professor BAILLON had then recently brought under the notice of a meeting, at Bordeaux, of the French Association for the Advancement of Science, as having been received from Thibet, with the claim that it represented the long-disputed source of official rhubarb. The plant was first cultivated at Montmorency; afterwards it was grown in the gardens of the Academy of Medicine, Paris, at Clapham, by the late Mr. DANIEL HANBURY, and in the Royal Gardens at Kew, where its noble proportions have no doubt excited the admiration of many of our readers. It proved to belong to an entirely new species, which Professor BAILLON described under the name of *Rheum officinale*. Since then its claim to be considered at least as one of the sources of official rhubarb has been fairly well established, and in the two new Pharmacopœias just issued that drug is described as being yielded by *Rheum officinale* and other unnamed species of rhubarb. As a natural consequence attempts have been made, both in this country and in France, to cultivate the plant on a commercial scale for the sake of its root, but it cannot be said that the results yet obtained have been satisfactory. For instance, the root of a plant of *Rheum officinale*, three years old, grown at Banbury, and examined in 1877, presented none of the characters of true Russian rhubarb, and gave rise to the impression that the drug was the product of a plant of much slower growth. But this may be attributable to the climatic and other conditions under which the plant grows in its native country, especially as the result was not quite in accord with the observations made upon a plant grown at Clapham. Efforts to secure the naturalization of the plant have also been made by the Paris Acclimatization Society, and this body has recently had placed at its disposal some interesting information from Herr HEUDER, German Consul at Shanghai, that may facilitate the making of future experiments under more favourable conditions.

Herr HEUDER states that for two years he was engaged unsuccessfully in attempts to obtain living plants of *Rheum officinale*, being foiled sometimes by the opposition raised by the natives, and at others by difficulties attending the transport of the plants, which always perished in the course of the long journey from the western parts of China to the sea-coast. Eventually success was achieved by Herr FRANZENBACH, an interpreter to the consulate, who brought back from an excursion into Mongolia three specimens which were considered to represent the true rhubarb plant by the native doctors, and two of which appeared to correspond with the botanical description of *R. officinale*. On leaving Pekin, Herr FRANZENBACH had first taken a north-west course to Kalgan, and then, proceeding in a line due west, he crossed the Yellow River twice, and reached the Mongolian region situated on the north-west of the Chinese province of Shensi, where he discovered large quantities of the plant, and was assured by the Mongols living there that it was the source of the rhubarb sent into commerce. He himself pulled up four specimens, including apparently two varieties; these he planted in a wooden Mongolian milk pot, and, after encountering many perils during a journey of six weeks, brought three of them alive and in good condition into Shanghai. According to Herr FRANZENBACH, these two varieties or species of *Rheum* grow wild in considerable quantity upon the mountain slopes, but they are especially abundant in the alluvial lands which are saturated with water only in the spring. In this region the temperature falls in the winter to seventeen degrees below zero Fahrenheit; the hard weather lasts about eight months, but there is little snow. In summer, the average temperature is from 72° to 77 F.

When the roots are about six years old the Mongols extirpate them, like asparagus, to about four inches below the surface, leaving the stocks in the ground, where they throw out new shoots. The cut portions, after being dried carefully in the air, are sold to the Chinese, who send them into commerce after removing the cortical portion. The method of multiplying the plant adopted by the natives is curious. A piece, about an inch in length, is cut from the upper part of the root, where there are a number of small shoots, and this is again subdivided, taking care that each fragment contains a portion of root. At the end of the root an incision is made, into which a seed of any kind is introduced, and the fragment is then planted with the shoot pointing upwards. The process has been imitated by Herr FRANZENBACH, and he says that he has in this way succeeded in raising fine plants. With seed he was less successful, as it appeared to lose its germinating powers after an interval of a few months. Herr HEUDER adds that various species of *Rheum* appear to grow in Thibet and Siberia and other countries west of China and Mongolia.

PHARMACEUTICAL LEGISLATION IN QUEENSLAND.

The pharmacists of Queensland appear to be making a vigorous effort to get the management of pharmaceutical affairs in that colony placed in their own hands, the power of granting certificates to carry on the business being, as mentioned recently, now vested in a Medical Board. About two years since a Pharmaceutical Society was established with the object of obtaining reform in this and other directions. Last year a Bill embodying the views of the Society was introduced into the Colonial Parliament and passed the Lower House, but after reaching the Upper House it had to be withdrawn, apparently under pressure of medical influence. The Pharmacy Bill has, however, been reintroduced in the present session and at the time of our last advices it appears to be again encountering resistance from the same quarter. The opposition has indeed been carried so far that seven members of the Medical Board have published a notification to members of the Queensland Parliament that they consider this application for legislation premature, on the grounds that the present status of chemists and druggists in Brisbane is far too low to fit them to undertake the responsibility sought by them, and that two official boards, one medical and one pharmaceutical, would lead to antagonism and an undesirable state of things. There may be something peculiar in the atmosphere of Brisbane which creates an exception to the rule that pharmacists have proved themselves capable of managing their own affairs without becoming antagonistic to the medical profession, though we do not think it probable. Anyway the work done under present arrangements must be very perfunctory, if the Medical Board takes the position, as is asserted, that it has no power to examine pharmaceutical candidates, and has no option but to grant certificates to all who present themselves for registration with evidence of having served a three years' apprenticeship. It is not surprising to learn that under such a system a man has been registered as competent, who recently confessed at an inquest his ignorance of any difference between the two oils of almonds. Surely, any change in the law could hardly give a more unsatisfactory result.

THE ENFORCEMENT OF POISON REGULATIONS IN VICTORIA.

We learn from the Melbourne papers that the Pharmacy Board of Victoria has just won one of those Pyrrhian victories which too frequently fall to the lot of bodies that have to fight the battles of the public. It occurred in connection with a charge against a grocer for selling a rat poison consisting of coloured arsenic, in contravention of the colonial Act regulating the sale of poisons, which resembles the English law. The defendant, who was unregistered and sold the poison without making any inquiry or entry of sale, appears to have treated the business very lightly, making no defence beyond saying that he had bought the poison from the representative of an English firm and that he knew nothing about it, except that it killed rats in a remarkably quick manner. The police magistrate, sympathizing with the defendant in his ignorance, fined him only one shilling and limited the costs to ten shillings, thus practically imposing a fine upon the Pharmacy Board for carrying out a public duty, probably amounting to several times that imposed upon the offender. It is satisfactory to notice that the magistrate's decision has been subjected to sharp editorial criticism in the colonial press, and what is more the editors appear to have made themselves acquainted with the actual provisions of the law before writing upon the subject, an example that might be in many cases followed with advantage by the editors of the daily and weekly press in this country.

THE DANGERS OF PYROTECHNY.

By order of the Secretary of State for the Home Department an inquiry has been instituted in regard to the circumstances attending the explosion of fireworks at the Hull Botanic Gardens last September, and in the report furnished by one of the inspectors of explosives it is shown that it was due to the use of a mixture of chlorate of potash and sulphide of antimony in the preparation of stars intended to be fired out of a mortar loaded with gunpowder. These stars instead of being thrown up into the air and ignited at the moment of discharge, exploded within the mortar, bursting it and causing the death of two persons besides serious injury to several others.

Captain Cundill, the reporter, points out the danger attending the use of this kind of fireworks and insists upon the necessity of all possible precautions being taken to minimize that danger, one of the conditions requisite for this purpose being naturally the possession of chemical knowledge on the part of those who make fireworks. There is reason to fear that this is too frequently wanting, and in the case now referred to the pyrotechnist admitted he had no chemical knowledge whatever, making compositions simply by receipts without knowing anything of the results of putting the various ingredients together. The report states in reference to this confessed ignorance, which seems to prevail with all firework makers, that though there does not appear to be reason for complaining of the substantial justice of the verdict of "accidental death" given by the coroner's jury there is at least an opportunity afforded of profiting by the terrible lesson given to pyrotechnists by the sad results of this accident.

BRITISH MEDICAL ASSOCIATION.

According to an official announcement of the arrangements at present matured, the British Medical Association will hold its Fifty-first Annual Meeting next year, in the Liverpool College, Liverpool, commencing on the 31st of July, the President-Elect being Dr. A. T. H. Waters. The Address in Surgery is to be delivered by Professor Reginald Harrison, and the Address in Pathology by Dr. Charles Creighton.

Transactions of the Pharmaceutical Society.

GENERAL MEETING—BENEVOLENT FUND.

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society, and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, December 15, at 12 o'clock, for the Election of Six Annuitants.

Mr. Michael Carteighe in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the eighteenth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result:—

Dixon, Mary Elizabeth	6914
Rowlands, Amelia C.	3030
Sutterby, Catharine M.A.	2786
Henly, Mary Ann	2768
Davies, Henry Edward.	2753
Broadwater, Elizabeth	2278
Wavell, John	1687
Taylor, Henry	1094
Powell, Mary Jane	1018

3556* voting papers were received, of which number 64 were informal (54 unsigned) and were disallowed.

J. Robbins, *Chairman.*

Charles J. Mead.	W. Toogood Frost.
T. Howard Hall.	R. A. Robinson.
E. N. Butt.	Robert Rowe.
W. H. Ferguson.	J. O. Braithwaite.
Charles E. Turner.	W. Smith.
J. T. Tupholme.	Robert H. Davies.
W. Inchle Gulliver.	George S. Taylor.
R. Fisher Young.	W. H. Symons.
Thomas Rich.	Chas. B. Allen.
Walter Hills.	

December 15, 1882.

The Chairman declared the following six duly elected Annuitants:—

Broadwater, Elizabeth.
Davies, Henry Edward.
Dixon, Mary Elizabeth.
Henly, Mary Ann.
Rowlands, Amelia C.
Sutterby, Catharine M. A.

On the motion of the President it was resolved—

"That the best thanks of the subscribers are due, and hereby tendered, to the Scrutineers for their valuable services."

A vote of thanks was also given to the Chairman.

* 5742 voting papers were issued by the Secretary.

EXAMINATIONS IN LONDON.

December 13, 1882.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The undermentioned *two* passed, and were declared qualified to be registered as Phamaceutical Chemists:—

Fowler, George.....Tewkesbury.
Marshall, Joseph Jewison .....Beverley.

MINOR EXAMINATION.

Nineteen candidates were examined. *Twelve* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Armstrong, Frank .....Workington.
Bing, Charles .....Canterbury.
Blackham, William George.....Liverpool.
Brisley, George.....Margate.
Carr, Percy .....Sheffield.
Chater, Arthur Brand.....Elmdon.
Clague, Thomas Maltby .....Douglas.

December 14, 1882.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

Dr. Greenhow was also present.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Burton, Walter.....Mansfield.
Nichol, Anthony .....Carlisle.
Richards, Thomas..... St. Clears.
Williams, William Jesse .....Crickhowell.

MINOR EXAMINATION.

Eighteen candidates were examined. *Eleven* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Collins, Herbert Sleight .....Bradford.
Cox, Webster .....Liverpool.
Critchlow, Henry.....Oldham.
Doo, James Emile .....Atherstone.
Eastwood, Thomas Earnshaw...Skelmanthorpe.
Freeman, John Henry.....Ipswich.
Goodwin, Walter Frederick ...Norwich.

December 19, 1882.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Twelve* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Harvey, Frederick .....Margate.
Holwell, Alfred .....Loughborough.
Hopkins, William Richard .....Aberystwith.
Houfe, Robert William .....York.
Hurcomb, Lawrence Edmund...Nottingham.
Isaac, James Griffith .....Strood.
Jenkin, William John.....Plymouth.
Lambert, John Thomas .....Hoyland.
Langley, Frank Collins .....Ashford.
Luxmoore, Charles Mann .....Bristol.
Marsh, Edward.....Luton.
Oldershaw, John .....Nottingham.

December 20, 1882.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Ten* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hopkinson, Harry .....Grantham.
Jones, William..... .....Carmarthen.
Neve, Annie .....London.
Parker, Charles Henry Mitchell.South Molton.
Pask, Thomas Edward .....Newark.
Perkins, Charles Lynham .....Plymouth.
Pope, Albert Harry..... .....Southport.
Pridmore, Sydney Spencer .....Hinckley.
Puckey, Courtenay .....Herne Hill.
Rednall, William Rush .....Northampton.
Rees, John Arthur ..... Cardiff.
Ridgley, Cromwell .....Huntingdon.
Rigden, George .....Folkestone.
Ryley, Edward..... .....Louth.

December 21, 1882.

Present—Mr. Carteighe, President; Mr. Atkins, Vice-President; Messrs. Barnes, Benger, Brady, Corder, Ekin, Gale, Greenish, Linford, Martindale, Plowman, Southall, Taylor and Thresh.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Fifteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Gulliver, Walter Frederick.....London.
Sharpe, William Cecil.....Madeley.
Skyrme, Henry Edward .....Cardiff.
Smalley, Arthur William .....Stamford.
Smith, William Thomas .....Bath.
Steward, Henry Clarke .....Ludlow.
Walton, Frederick Milcs.....Reading.
Whiffin, Henry.....Market Harborough.
Young, Robert John .....Bideford.

PRELIMINARY EXAMINATION.

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

Certificates of the College of Preceptors.

Arnison, William S. .....Sunderland.
Baker, Sydney George .....High Barnet.
Hayward, Savill .....Trowbridge.
Humphreys, Thomas H. P. S...Denmark Park.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Parkinson, James.....Oldham.

Certificate of the Royal College of Surgeons in Ireland.

Dodd, Richard Jefferson.....Sunderland.

Certificates of the University of Cambridge.

Everett, John Garwood .....Ipswich.
Everett, Walter Edes .....Colchester.

Certificate of the University of Edinburgh.

Cockburn, David .....Dunse.

Certificate of the University of Oxford.

Palmer, Charles Joseph .....Wingham.

Resolved—"That the Board of Examiners desire to convey to Mrs. Allchin and family the assurance of their sincere sympathy in the severe loss they have sustained through the decease of the late Mr. Allchin.

"Mr. Allchin had won and retained, during a lengthened career on the Board, the confidence and esteem of his co-examiners, and in this expression of condolence with the family, they also bear testimony to their own loss of a valued friend and colleague."

Resolved—"That Mr. Martindale, having expressed his intention to retire from the Board of Examiners in consequence of the increasing claims of his own business, the Board desires to record its appreciation of the valuable services rendered by Mr. Martindale during the ten years he has been an examiner, and its regret at losing an esteemed colleague."

Resolved—"That the foregoing resolutions be entered on the minutes of the Board."

NORTH BRITISH BRANCH.

EVENING MEETING.

The second meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday evening, December 13, at 9 o'clock.

Mr. Alexander Napier, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The Secretary to the Branch then announced the following donations;

To the Museum:—

Specimens illustrating the manufacture of soda, consisting of the following:—

Salt Cake, Black Ash, Diamond Soda, Soda Crystals, Caustic Soda, Hydrochloric Acid, Bleaching Powder, Black Oxide of Manganese (recovered), and Crystal, Rock and Roll Sulphur (recovered from Alkali Waste by Mactear's process).

From Messrs. Charles Tennant and Co.

Twelve specimen bottles for the above.

From Mr. Alexander Kinninmont.

Capsicum annuum, fructus, and
Convolvulus scammonium, radix.

From Messrs. T. and H. Smith and Co.

A piece of Spurious Opium.

From Messrs. J. F. MacFarlan and Co.

In calling attention to these donations, the Secretary remarked that the specimens of alkali products had come through the Glasgow Apothecaries' Company. The specimens of recovered sulphur were very pretty, and they were of interest from the fact that a waste material was utilized in their production. The specimens of scammony root exhibited had been selected from a large bale; the roots were very typical. The donors, he understood, went through large quantities of scammony in manufacturing the resin; a specimen of which would be exhibited at a future meeting. The piece of spurious opium was one of twenty-five pieces which had been picked out of six cases of opium imported from Smyrna. The weight of the twenty-five pieces was 16 lbs. 12 ozs. With the exception of the covering, the specimen in no way resembled opium; internally it was of a lighter colour, of a tough and glutinous consistency, and it had a faintly aromatic odour somewhat like Socotrine aloes. The specimen contained no morphia.

On the motion of the President a vote of thanks was given to the various donors.

Mr. Robert Aitken, then read a paper on "The Pharmacopœial Extracts of Aloes and their Preparations," which is printed on p. 501.

The President said that aloes was an important drug and one of great antiquity; indeed, our knowledge did not seem to grow with the length of time in which it had been in use. The late Professor Christison had shown that prolonged heat greatly deteriorated the drug, and it was his opinion that it is better to use the purest samples

of aloes as imported in preference to aqueous extracts of the drug. The investigations of Mr. Aitken showed that aloes is subject to very great change when converted into extract by the pharmacopœial method; and it was gratifying to know that he had prepared an extract free from resin. In moving a vote of thanks to Mr. Aitken he remarked that the paper was one of practical utility. It was such papers, more especially from young pharmacists, which proved interesting, and he hoped that there would be many more of the same kind.

Mr. Young said that the meeting was indebted to Mr. Aitken for having drawn attention to the matter. From the circumstance which led him to institute the experiments it was well to suppose that there was some difference in the preparations, and he deserved commendation for having acted as he did. The paper would direct attention to the subject, he hoped, and manufacturers would probably act upon the suggestions which had been thrown out.

Mr. Aitken stated, in reply to Mr. Young, that he had been particular in selecting good samples of Barbadoes and Socotrine aloes. He had made extracts with both of these and he got the best results by evaporating with hot air.

Mr. Hill said that he had much pleasure in listening to the paper, which dealt with a practical question and pointed out a discrepancy which, he was afraid, occurred with other official preparations than extract of aloes. Manufacturers were apt to adopt expedients by which they could produce preparations more rapidly than by the official process, without a due regard to the properties or efficacy of the resulting products. He hoped that the method of evaporation by hot air would commend itself to manufacturers.

The next paper read was on "The Preparation of Syrupus Ferri Phosphatis by a New Method," by Mr. Daniel Gorrie. The paper is printed on p. 501.

The President said that he had not found much difficulty with the official process; however, Mr. Gorrie's method seemed to be simpler and the syrup more permanent than the ordinary preparation. He had much pleasure in moving a vote of thanks to Mr. Gorrie.

Mr. Nesbit said that although the method proposed was a very simple one, yet he did not think that it would ever come into general use; for although it might answer very well in the hands of a careful and competent person, yet if entrusted to some one not so competent there would be liability of contamination with baryta, the poisonous nature of which, he maintained, precluded its use.

Mr. Stephenson said that he held much the same opinion as the previous speaker, and he could only add that he had found the syrup by the official method to keep for a long time; still the method proposed was an ingenious one and as such the author deserved credit for it.

This being all the business the meeting adjourned.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION

A lecture was delivered at the rooms of the above Association, on Wednesday evening, December 13, by Mr. J. E. Weatherhead, on "Teeth." Mr. J. J. Edwards presided. There was a good attendance.

The lecturer having described the substances, number and form of the teeth, pointed out the peculiarities in dentition of the different species of animals, showing skulls and teeth belonging to the orders Mammalia, Quadrumana, Rodentia, Carnivora, Proboscidia, Ungulata, Cetacea, Reptilia, Amphibia and Fishes. The lecture was illustrated by a quantity of beautiful diagrams and specimens, and was delivered in a highly interesting and instructive manner, and appeared to be thoroughly enjoyed by the audience.

Mr. Edwards proposed a vote of thanks to Mr. Weatherhead, which was seconded by Mr. Shirlby and carried.

BLACKBURN CHEMISTS' ASSOCIATION.

The annual meeting was held at the rooms, Exchang Street, on Monday, December 11. Mr. W. Farnworth presided.

The balance sheet was read and approved of.

The following are the officers for the ensuing year:—President, Mr. A. P. Garland; Secretary, Mr. J. W. Clayton; Assistant-Secretary, Mr. Jowett; Librarians Messrs. W. C. Rundle and J. Hindle.

Votes of thanks to the various officers for their services during the past year were passed.

On Friday, December 15, in connection with the Improvement Class, Mr. S. Kirklan delivered a lecture on "Arsenic." Mr. J. G. Tier presided.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the session was held on Wednesday, December 6, in the rooms of the North British Branch. Mr. P. Boa, President, in the chair.

The minutes of the previous meeting having been read and adopted, the Chairman called upon Mr. C. F. Henry to open, on the affirmative side, a debate on the question, "Does a necessity exist for further legislative restriction as to the sale of poisons?"

Mr. Henry first gave a brief historical *résumé* of the legislation in regard to poisons which had taken place during the last thirty years. He then proceeded to argue:—1st. That that part of section I. of the present Poison Act should be more definite which stipulates the drawing up of regulations for the keeping, storing, dispensing and selling of poisons. No regulations at present existed for the storing of drugs. Mistakes often occur through the too close proximity of poisonous to harmless drugs, and he thought that some regulations were imperatively required. Cases of accidental poisoning had increased 15·3 per cent. during the last five years, and he thought this indicated a necessity for some regulations in regard to the way in which poisons were placed in the hands of the public. 2nd. That the present poison schedule is far from complete. He suggested that the following should be added to the second part of it, viz.:—phosphorus and its medicinal preparations, carbolic acid and vitrio in quantities under one gallon, the salts of lead, copper, and zinc, croton oil and tincture of hyoscyamus. A reference to the Registrar General's Reports for the last ten years showed that some of the foregoing were far oftener the cause of fatal poisoning than many of those at present in the poison schedule. For instance, in one thousand cases of poisoning, 30·8 were caused by vitriol; 17·5 were caused by phosphorus; 94·2 were caused by carbolic acid; 1·7 was caused by hellebore; 1·2 was caused by cantharides; 4·8 were caused by aconite; 39·8 were caused by arsenic, and 12·3 were caused by chloro form, chloral and chlorodyne. 3rd. That legislative restriction should be imposed on the sale of poisonous patent medicines. Coroners had over and over again expressed an opinion to this effect and their opinion had been unanimously endorsed by juries. It short, it was admitted on all hands that something ought to be done to bring the sale of these articles under some control. The fact that a 1*s.* 1½*d.* bottle containing a solution of some powerful scheduled poison could be purchased from many country grocers, as easily as a pound of cheese or a couple of farthing candles, he thought sufficient to convince anyone that these poisonous patents

ought to be included in the Poison Act. 4th. That no child under sixteen years of age should be supplied with any scheduled poison. 5th. That the sale of poisons should be restricted not only to pharmaceutical chemists and chemists and druggists, but also to qualified assistants, and that no others should be allowed to sell or retail them by any means. He knew that here he was treading on delicate ground, but he trusted he would not offend anyone if he stated his humble opinion on this matter. He reminded them of the argument which was used with great force against the Pharmaceutical Society by the law agent of a co-operative company in London who had been prosecuted for retailing and dispensing poisons,—the argument, viz., "That the public were safer in going to a co-operative store for poisons than to the branch shops of chemists, as most of these shops were conducted by unqualified assistants, whereas at the store the company kept a qualified assistant." It seemed to him that the time had come, if it was not far past, for this flaw in the Pharmacy Act to be remedied. No doubt the framers of the Act never intended that such a state of matters should be possible, and no doubt also in the existence of such a state of matters the spirit, if not the letter of the Act, was broken. In addition to the foregoing arguments he might, he said, have gone into the question of transferring the duties at present discharged by the Pharmaceutical Society to a public prosecutor, but he thought he had said enough to prove that the present legislation restricting the sale of poisons was incomplete, and that a necessity existed for further restriction.

The negative side of the question was opened by Mr. W. S. Adamson, who contended that no necessity existed for further legislative restriction, because, 1st. In the law, as it at present stood, there was sufficient power to cope with any emergency that might arise, and that it only rested with the Council of the Pharmaceutical Society to exercise the powers conferred upon them by clause 2 of the Pharmacy Act, 1868. 2nd. Any further restriction would tend to embarrass the seller. This point was illustrated by one or two incidents typical of what took place even under the present regulations, and he contended that any further restriction would only increase this embarrassment without conferring any advantage either on the public or on the chemist. 3rd. He concluded by saying that in agitating for further restriction on the sale of poisons they were doing that which would lower the standing of the chemist in the estimation of the public, and confessing that they were not competent to discharge the responsibility which at present rested upon them in connection with this matter. He, therefore, hoped that the majority of those present would agree with him that no necessity at present existed for any further legislative restriction.

The debate was continued by Messrs. Boa, Low, Maben, MacEwan, Robertson and Turnbull. The opener having replied, a vote was taken, and the affirmative declared carried by a majority of 14.

The Chairman, having intimated that the next meeting would be on Wednesday, December 20, when a paper on "The Haloïd Elements," would be read by Mr. J. Suttar, the meeting was closed.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting was held at 23, Burlington Chambers, New Street, Birmingham, on December 13. The attendance was very fair, considering the inclement state of the weather. The chair was occupied by Mr. Barclay.

The Chairman, after some remarks, moved the adoption of the balance sheet, which showed a satisfactory balance of over £39 in the treasurer's hands.

This having been carried, the meeting proceeded to the election of officers, Mr. Lucas being appointed President, Messrs. Barlow and Brown accepting the Vice-Presidentships, the Treasurer, Auditors and Committee being re-elected.

The question of publishing a revised edition of the Price List aroused considerable discussion, and was decided in the affirmative; a sub-committee was then formed for that purpose.

It was then, on the motion of Mr. Barclay, resolved to appoint a sub-committee to carry out the arrangements for the annual *soirée*, the profits of which are devoted to the Benevolent Fund of the Society. It was also decided to resume at an early date the meetings for the reading of papers, and several gentlemen were reported as willing to give their services.

A sum of £5 was voted for the further increase of the Library, which the Librarian reported was being more appreciated by members.

It was then resolved, upon the motion of the Chairman, that a sum of £5 be voted from the profits of last year's *soirée* to the Benevolent Fund of the Pharmaceutical Society, the proposer testifying to the very able and careful manner in which that Society disbursed the money at its disposal.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, December 20, 1882, at 4 p.m.

Present—Professor Attfield, F.R.S., President, in the chair; Messrs. Brady, Ekin, Naylor, and Messrs. Benger and Plowman (Hon. Secretaries).

The minutes of the previous meeting were read and confirmed.

Letters of apology for non-attendance were read from Messrs. Ashton, Kinninmont, Payne and Radley.

A letter was read from the printers saying that the whole of the matter of the 1882 Year-Book was in type, and that copies would be ready for delivery during the last week of the year at the rate of about two hundred and fifty per day. Members who have paid their subscriptions will be supplied in alphabetical order. Although the publication has been delayed, owing to domestic affliction of the editor, the Year-Book will nevertheless be in the hands of members somewhat earlier than usual.

Mr. Siebold was appointed editor of the Year-Book for 1883.

The following gentlemen were elected to membership: Mr. J. Clower (Leamington); Mr. F. Hole (Mansfield); Mr. C. J. Mead (London); Mr. S. C. Nicholl (Belfast); Dr. F. Taylor (London); Mr. R. Berkley (Brisbane); Mr. B. Fawcett (Sydney); Mr. T. Ingham (Rockhampton); Mr. O. J. Kempthorne (Dunedin); Mr. E. Taylor (Brisbane).

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, December 14, Professor Attfield, F.R.S., President in the chair.

The following paper was read on—

The Present State of Original Investigation in Pharmacy in this Country.

by E. M. Holmes, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

The title I have chosen for this paper will perhaps be understood to mean the examination for the first time of substances used in pharmacy, which never before have had the light of science thrown upon them from a chemical, histological or botanical standpoint.

But as I am addressing gentlemen of whom many have

but recently commenced a course of study, and who therefore are not in a position to do this, who have, in fact, as yet to acquire the necessary knowledge and skill, it is obvious that another meaning must be sought in these words.

The true meaning of language becomes apparent only when the derivation of words is traced out. Now original is derived from *origo*, a beginning, and investigation from *in*, in or upon, and *vestigium*, a footstep. The idea, then, which seems to be conveyed by the word "investigation" in the first place was probably the following up or tracing a person or animal by the footsteps, and this meaning would naturally be afterwards applied to inanimate objects, and ultimately to abstract ideas. As applied to pharmacy, it would also signify the following of footsteps, and the word "original" would imply that this following must have a beginning with the one who undertakes it.

Having, then, the opportunity of observing footsteps, numerous and varied, imprinted on the many divergent ways which lead to and from the home of pharmacy in this country, I will endeavour to direct you along the right path and to advise you in which footsteps to follow.

The majority of those who visit Bloomsbury Square appear to be travelling on the road which may be named prosperity in business; a lesser number along one which may be called a scientific career, and apparently very few indeed who have before them the long, straight, and apparently difficult road of a life successful in a moral sense.

Let us, then, in the first place, look around to observe traces left by those who have already made their mark, or left their imprint on the road before us, *as successful men of business*, and trace back as far as we can their previous footsteps, so that we may learn the secret of their prosperity. In one or two cases which have come under my own notice, it may be interesting to direct your attention to some of the footsteps which I have been able to trace back. In conversation with Mr. T. N. R. Morson, in the Museum of this Society, a few years ago, he informed me that he usually obtained from opium a much larger percentage of morphia than that mentioned in books, and it is well known his aconitine and creasote for many years defied competition. Now this implies scientific chemical knowledge in advance of his compeers. Such knowledge is obtained only by hard work and careful observation and experiment.

Mr. Peter Squire himself informed me that his success in life was largely due to the hard work and careful observation and experiment bestowed on the preparation of extracts of good quality at a time when it was almost an impossibility to obtain such an article in the trade. He had purchased some hemlock brought to the door by a countryman, and knowing that it would heat and spoil if kept until the next day, he sat up until three o'clock a.m., to transform it into extract. On examining it by daylight, he found it so superior in colour, odour and taste to any he had been able to purchase, that from that day forth he determined to make all his own extracts. These, exposed on his counter, attracted the attention of the Royal Physician, so that it shortly after became true of him, "He that is diligent in business shall stand before kings."

Those who have read the 'Progress of Pharmacy" will remember that Thomas Herring, of the firm of Herrings and Co., was the first to introduce vegetable powders of good quality ground on his own premises.

I need only recall the names of others, such as Howard and Huskisson, to remind you that scientific knowledge and manipulative skill have a great deal to do with success in business.

The reputation of most of the celebrated firms, both wholesale and retail, whose names are inseparably connected with the history of pharmacy in this country, rest upon the same foundation.

We may next trace the footsteps of *scientific men* who have been connected with this Society. Take, for instance, Dr. Pereira. His work on materia medica remains unsurpassed at the present day as a monument of industry and thorough mastery of detail. He allowed no obstacle to stand in his way; whether a foreign language, crystallography, or polarization of light,—every subject connected with his work was thoroughly mastered. His mantle, so to speak, fell upon one of his favourite pupils, Daniel Hanbury. When 'Pharmacographia' appeared it was felt at once that a new era in the history of materia medica had begun; that here was a book which was not made with scissors and paste, into which no errors of preceding authors had been copied with unquestioning faith, but one in which no statement was made which had not been verified by the personal experiments of the authors; in fact that it was the outcome of the patient research of a lifetime.

Mr. Hanbury was in the habit of carrying with him wherever he went a note-book in which to copy memoranda derived from books, information given him by travellers, or the results obtained by his own experiments. These note-books were of quarto size, and carefully indexed, fifteen of them being filled during his lifetime; the sixteenth was left unfinished.

These I have recently had the privilege of examining with a view to extract remarks which might throw light on the specimens in the rich and interesting collection of materia medica subsequently presented to this Society by his brother, Mr. Thomas Hanbury. I have been struck on going through them by the pertinacity with which he followed up any clue, the unsparing and yet gentle hand with which he corrected errors, and the conscientious striving for accuracy and exact truth which characterized all his investigations. Thus his inquiry into the botanical source of liquid storax necessitated correspondence in Europe, Asia, and America, extending over a considerable time. Yet he would never accept a statement as fact unless he obtained corroborative evidence from an independent source, although in some cases he had to wait weeks, months, or even years for it. It is this "veracity" as Carlyle would have called it, this love of truth, which gives such a high value to 'Pharmacographia.' Every fact there stated is vouched for by the author's well-known character as an accurate scientific observer, this feature being as it were stamped upon every page.

Some of the entries in the first book show that when any new statement was made in the *Pharmaceutical Journal* he at once tested it by experiment, and recorded the result in his book. Others show that he examined carefully such chemicals as aconitine soon after they were bought. These experiments seem to have been carried on contemporaneously with his attendance at the lectures, and indicate that he was not content with merely reading and hearing, but as far as possible followed out the apostolic injunction to "prove all things and hold fast that which is good."

Our honoured Chairman, Professor Attfield, must indeed have traced with pleasure the footsteps of several of his pupils who have held the enviable position of Bell Scholars, and especially of the first one. No one could write such lucid and yet concise papers as those which appeared from Dr. Tilden's pen in the *Pharmaceutical Journal*, unless he had a clear conception of the facts in his own mind, such a conception, indeed, as could only have been acquired by the habit of doing thoroughly everything he took in hand.

But there are, I am happy to say, footsteps still more recent. I allude to Dr. Thresh. It must have required an indomitable determination and no small degree of courage to attack such a subject as capsicum; for so penetrating and irritating is the effect even of the crystals of capsaicin, that in moving it from one bottle to another with the greatest care severe coughing is sure to ensue. But it is this same faculty of perseverance and courage in over-

coming difficulties that has enabled Dr. Thresh to attain the high scientific degree he now holds.

It is scarcely within the scope of my subject to allude here to those few who travel along the road of life with the aim of living a life successful in a moral sense. There have been and are those who have placed this aspiration first, and who have been none the less successful business men and have had no less a brilliant scientific career in consequence. But of the satisfaction which rewards the travellers on this road, none can judge but those who experience it.

Having, then, endeavoured to trace the secret of success from the "footprints in the sands of time," may we not reasonably conclude that the qualities with which it is necessary to start on an equally successful journey are the capability of working hard and systematically, of exercising a close observation, a wise scepticism, followed promptly by experiment and by a record of the results obtained; and to crown all, the invincible resolution to overcome all obstacles in the path entered upon?

Underlying all there must be the golden maxim, "Whatsoever thy hand findeth to do, do it with thy might," and a conviction of the truth of the motto, *Labor omnia vincit.* These qualities should have been formed during apprenticeship, so as to have developed into habits by the time that a course of scientific study has to be begun; they do, in fact, constitute what are commonly known by the name of business habits.

When these habits are once formed and applied to study, all difficulties vanish and success is morally certain.

Unfortunately it needs but little observation to see that all have not received this necessary training, but that some, on the contrary, have developed habits of indolence, procrastination, superficial observation, carelessness of detail, and want of earnestness; in fact, an almost entire absence of the qualities essential to manhood or self-mastery, on which success in life largely depends.

This is due no doubt in some measure to want of careful parental training, and in no less a degree perhaps to the absence of conscientious supervision on the part of the business employer.

It is the absence of business habits, which should have been formed during the period of apprenticeship, and not the acquisition of scientific knowledge, that makes bad assistants. It is the same cause which gives rise to so many failures at the examinations; in other words business habits have not been applied to the study of science.

To those who have not had the advantage of this kind of training I would especially point out that the way in which work is done is far more important than the work itself; that, just as muscular strength is the result of physical labour, so mental and moral strength are the result of intellectual and moral exercise. Just as surely as it is true that he that will not work, neither shall he eat (because he cannot), so is it the fact that valuable habits will not be formed without regular exercise of the intellectual faculties. The true balance of the mind, like the balance of the body necessary to skating or tricycling, can only be obtained by practice.

If business habits and manipulative skill have not been obtained during apprenticeship, they will have to be gained during the subsequent course of study. Let your studies be mapped out for each day during the whole course and then carried out systematically with all the thoroughness and earnestness of which you are capable, and with the determination to leave no difficulty unsolved, and to know not merely all that is in the Pharmacopœia, but everything that is likely to be met with in any branch of the business, so that you can conscientiously feel that wherever you may be engaged no more competent assistant or more thoroughly equipped man of business can be found. This thoroughness is absolutely essential to success in any career. This is as true of nations as of individuals; it was this feature developed, in the almost microscopical character of national education, that made all the difference between defeat and victory to the German people in the late Franco-Prussian war.

I shall probably be expected to make a few remarks concerning original investigation in pharmacy in the ordinary acceptation of the term, and these must be addressed more particularly to those who have already formed business habits, and having applied them to their subsequent course of study have passed their examinations with flying colours.

In glancing through the index of the *Pharmaceutical Journal*, I have been struck with the comparatively small number of papers by English authors on subjects connected with the business of a pharmaceutical chemist, and with the fact that the greatest number as well as the majority of the best and most thorough articles have been written by German, Russian or French chemists. This may arise from the fact that, on the continent, graduates in pharmacy are required to write a thesis on a subject as yet untouched. This, however, cannot be the only reason since the inaugural essays published in the *American Journal of Pharmacy* by intending graduates are almost entirely wanting in the thoroughness and completeness which characterize those produced on the European continent. Nor does it arise from lack of subjects. To take a few instances:—Is there no room for improvement in decoct. aloes co., and pil. aloes co., ext. calumbæ or liquor taraxaci? Are there none of the numerous species of Eucalyptus that will yield a more satisfactory kino than that at present in use, or is it impossible to prevent the gelatinization of the tincture and yet preserve its activity? Is the present formula for ipecacuanha wine the best that could be devised? Is not the relative activity of the two resins of jalap worthy of investigation? Is it impossible to devise more economical processes for the extraction of alkaloids and active principles? Are there no vermifuges used in other countries possessing the advantages and none of the disadvantages of santonin. Are the preparations of aconite as satisfactory as they might be? Preparations of eserine keep very badly and a readily soluble salt that will keep well is still a desideratum. The purity of olive oil and of essence of lemon is always questionable, and no good test for the purity of either has yet been made known. Exact information is wanting also concerning the relative value and purity of artificial chemicals, such as benzoic acid, salicylic acid, chinoline, etc., as compared with the natural products.

These are a few points which occur to me as an outsider. But there are innumerable ones which must occur in daily business which need investigation, and on which the mental powers might be sharpened like iron on a whetstone. The *eye trained to observe and the hand to experiment and the spirit of thoroughness* are all that are needed to take away this reproach to pharmacy in this country. If I may venture to illustrate my meaning by alluding to a member present, I would point out the admirable investigations by Mr. R. H. Parker of some crystals found in furniture-polish; these crystals might have been thrown on one side, and an example of a research carried out in a most thorough and business-like manner might have been lost. In this case the only reward seems at present to be in the feeling that his example may lead others to attain equally valuable habits, and that thus he may benefit humanity. But this is not always the case. There are many points to be met with in the ordinary work of a pharmacist which, if followed up by experiment, will as surely lead to success in business and in benefit to humanity at large as Watt's observation of the lifting of the kettle-lid and his experiments thereupon. Those who have formed the habits I have alluded to cannot help applying them in their daily lives, and many a fortune has sprung out of a simple investigation. It was the search after a method of making quinine artificially that led to the discovery of the aniline dyes. It was the examination of seaweed at

Worthing, by a former student of this Society, Mr. E. C. C. Stanford, that led to the establishment of one of the largest manufactories of iodine in this country.

If my remarks have been rightly understood they will indicate that unless the habits of observation and experiment are formed in early life, it is vain to hope for an increase in original investigations in pharmacy, and that success in business, in science and in life, is dependent upon the possession of certain sterling qualities, of which knowledge is merely the instrument. That there is room enough in pharmacy for those who will take the trouble to cultivate these, I entertain not the slightest doubt; they have commanded success before and always will. Let the pharmacist be a pharmacist and not a grocer, a perfumer, or a drysalter, and he will no longer have to compete with those trades to his disadvantage. The only points upon which you can lay claim to public consideration and to proper emolument rest on special knowledge and skill.

A discussion followed, in which the President, Secretary, Messrs. Alcock, Giles, Greenish and Parker took part.

A vote of thanks was passed to Mr. Holmes.

The Secretary then announced that the Executive Committee had appointed the following gentlemen to act as a Committee of Reporters for the ensuing session:

Pharmacology	Mr. H. G. Greenish.
Materia Medica	Mr. W. Elborne.
Botany	Mr. J. O. Braithwaite.
Physics	Mr. H. Allen.
Organic Chemistry	Mr. W. R. Dunstan.
Inorganic Chemistry	Mr. F. W. Short.
Analytical Chemistry	Mr. C. Thompson.

The Executive Committee had also drawn up the following constitution and rules for the administration of the Research Fund:—

1. The fund shall be called "The Research Fund of the School of Pharmacy Students' Association," and its object shall be to encourage research in pharmacy and allied subjects by the defrayment of expenses incurred by members in the investigation of subjects forming the bases of communications to the Association. The balance in the hands of the Association shall be applied for this purpose and the administration of the fund shall rest with the Executive Committee.

2. The maximum grant for one subject in any one year shall be £2.

3. No grant shall be made for the payment of personal expenses.

4. Any member desirous of obtaining a grant from the fund shall submit a written statement of his application to the Secretary, specifying the nature of the investigation, the probable length of time which will be occupied by the same, and the amount of the grant applied for; also furnishing any other information which is likely to be of assistance to the Committee in considering the application. The Secretary shall then bring the application before the Executive Committee at its next meeting.

5. Members holding grants from the fund shall once a year forward to the Secretary a statement of the progress made with the investigation and of the expenses incurred since the grant was made. The Secretary shall then bring the statement before the Executive Committee, who shall report the same to the Association at the Annual Meeting.

6. When a grant is made to more than one member, the first member named shall be considered the secretary, unless a specific nomination is made, and he will be the only person entitled to receive the payment of the grant from the Treasurer.

Parliamentary and Law Proceedings.

Defective Measures.

At the Clerkenwell Police Court, on Thursday, December 14, Mr. William Davies, chemist, of 292, Gray's Inn Road, was summoned for having, on December 4, had in his possession three glass measures which were not stamped according to statute, one of them being 10 per cent. over measure.

The Defendant, in answer to Mr. Barstow, said he used the measures for poisonous drugs, but he knew his business and it made no difference whether the measures were stamped or not. He did not sell laudanum or any such drugs to the public in poisonous doses. He knew how to make the exact quantities with the glasses complained of. He had, however, had them replaced by stamped measures.

Mr. Barstow said that the defendant could not seriously allege that it made no difference whether glasses in which he measured poisonous drugs were right or wrong, and ordered him to pay a fine of 20*s*.—*Daily Chronicle.*

Alleged Acceleration of Death by an Opiate.

On Friday, December 15, Dr. Danford Thomas opened an inquiry, at the Islington Coroner's Court, on the body of Mary Wemhurst, aged 43.

Dr. George Brown, of Gibson Square, said that he was called to see the deceased by Mr. Burt, who stated that the deceased had taken a sleeping draught, and could not be awakened. He at once went to the house and found the deceased dead. He was handed a prescription written by Dr. O'Connor, dated 1876, each dose of which contained a sixteenth part of a grain of opium, in addition to other drugs. He had made a *post-mortem* examination, and had no doubt that death had been directly produced by an overdose of opium. In her condition such a draught should never have been given. All the evidences were those of opium poisoning.

By the Coroner: The dose she took would probably cause sleep in a healthy person, but undoubtedly death in a person suffering as the deceased did.

Dr. Alexander Wynter Blyth, the Public Analyst for Marylebone, said that he agreed with the last witness, but would not like to say that the death had been actually caused by the narcotic. He had no doubt whatever as to the inadvisability of giving any narcotic to a lady suffering as the deceased did. He held that a chemist had no right whatever to prescribe for a patient.

Mr. William Armstrong, of No. 33, Liverpool Road, deposed that he was a chemist's assistant, in the employ of Mr. Wootton. He was in the habit of putting up prescriptions for Mrs. Wemhurst, and did so on Monday evening. That was the prescription of Dr. O'Connor. At nine the same night, a young lady and gentleman came to him for an opiate, and he gave them 6 minims of tincture of opium and 10 grains of bromide of potassium. It was measured in a minim glass, and witness told Mr. Wootton of it then and there. The dose was made up to 1½ ounce by adding water. There was no prescription brought from Mrs. Wemhurst.

The Jury returned a verdict of death from bronchitis, accelerated by an overdose of opium, and blamed the chemist's assistant for prescribing.

Alleged Infringement of Trade Rights.

In the Chancery Division of the High Court of Justice, on Friday, December 15, the case of Smith *v.* Surfleet was heard before Mr. Justice Chitty. The plaintiff is a pharmaceutical chemist carrying on business in the Walworth Road and formerly in the Brixton Road, London, and the defendant is a chemist carrying on business in the Brixton Road, having purchased the plaintiff's business there. The plaintiff has for upwards of thirty years prepared and sold "Smith's Dr. McCann's Diarrhœa Mixture" and "Tasteless Dandelion Pills," and he has

been in the habit of enclosing the mixture in a buff-coloured wrapper and the pills in blue wrapper. He alleged that the defendant, who sold similar compounds, had used labels which were a fraudulent imitation. The plaintiff accordingly asked that the defendant might be restrained from continuing the use of the labels in question. The defendant denied that the labels were in any way an imitation of the plaintiff's and contended that even if they were he had a perfect right to use them as they formed part of the good-will of the plaintiff's business, in the Brixton Road, which had been sold to him. The defendant in order to make his labels distinctive had placed his name in large letters upon them and had also used other distinctive marks. In addition, he produced evidence to show that it was the custom of the trade to use blue wrappers for pills.

His Lordship, after comparing the two labels upon the mixture, held that the defendant's was not a fraudulent imitation of the plaintiff's, and with regard to the wrapper on the pills said that although there seemed to be some similarity between the two he could not in the present conflicting state of the evidence decide the matter upon interlocutory motion, and therefore he must decline to make any order upon the motion. The question as to what passed to the defendant by the sale of the good-will of the Brixton business was a matter which could very well be decided at the hearing of the action.

Obituary.

SAMUEL URWICK JONES.

Mr. Samuel Urwick Jones, to whose death reference was made last week, began business as a chemist and druggist on his own account in Bath, about the year 1840. From that city he removed four years afterwards to Leamington, where he carried on business successfully for thirty years. In 1845 he joined the Pharmaceutical Society, and for many years filled the office of Local Secretary to the Society in the Leamington district. When the Conference of chemists and druggists, held at Birmingham in July, 1876, decided upon the formation of a Chemists and Druggists' Trade Association, Mr. Jones was unanimously requested to become its first President, and he continued in that office until May, 1879. In Leamington, Mr. Jones's business ability and sound judgment were much appreciated; he was twice chosen to be Chairman of the Local Board of Health, and he besides served his townsmen in several other offices. A few months since he removed to Budleigh Salterton, where he died on the 9th inst.

Notice has also been received of the death of the following:—

On the 24th of October, Mr. Albert Edward Newbery, Chemist and Druggist, Ramsgate. Aged 33 years.

On the 20th of November, Mr. William Fox, Chemist and Druggist, Pontefract. Aged 79 years.

On the 30th of November, Mr. Alexander Gorrie, Chemist and Druggist, Kirkcaldy. Aged 43 years.

Subacet.—Add half an ounce of mucilage to the water before the quinine is mixed with it.

J. B. A.—Yes; the formula is borrowed from the German Pharmacopœia, where the liquorice is directed to be decorticated.

"*Pertinctus.*"—The three simple tinctures are not official; but if a prescription ordering one of them was of recent date, it would be generally assumed that the compound and official tincture was intended by the writer.

D. M. P.—Tinct. digitalis gives a slight opacity and a little colour to the mixture. A dark flocculent deposit will form after twelve hours' standing.

D. G.—A separation of matter, having the colour of yellow bark, takes place in this mixture and is gradually deposited. The quantity will vary with different samples of ext. cinch. flav. liq. used.

Correspondence.

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

The Election of Annuitants.

Sir,—The recent election of annuitants presents such an anomalous and inexplicable result, that I think the attention of the subscribers to the Benevolent Fund should be directed thereto.

In nearly every benevolent society, it is a fundamental axiom that those who have subscribed to its funds should have the first claim to its benefit, whenever adverse circumstances unfortunately render it necessary for them to participate therein, and provided they are found deserving.

On a reference to the *Pharmaceutical Journal* of December 9, at the bottom of page 471, will be found the following:—"The Secretary reported that only one of the thirty-six annuitants then on the list had ever subscribed to the Fund," therefore, voters at previous elections had little opportunity to elect other than non-subscribers; but at the recent election, out of nine candidates no less than five had been subscribers, and in virtue of such subscriptions were entitled to be credited with an aggregate of 375 votes. Naturally one would think these five were more entitled to our sympathy from their having been "one of us," yet of the three unsuccessful candidates, two had been subscribers for many years, while a third subscriber was only elected by the addition of votes obtained at a previous election, when the preference was again given to non-subscribers.

Last week the total number of votes polled by the five subscribers was only 2088 more than the votes polled by one non-subscriber, a result certainly not in accordance with what might have been expected.

Now a few words to the voters on another subject. On the last polling day, for nearly five hours twenty gentlemen were engaged in examining the voting papers and counting the votes. These gentlemen found their work unnecessarily increased by the great difficulty many of the voters experienced in following the very plain and explicit directions which were given to enable them to fill up their papers correctly, non-compliance with which caused the rejection of many of the papers and the loss of a large number of votes. This occurs every year, both at the election of annuitants and at the election of the Council.

I will give a few illustrations. Printed on the voting paper is a column headed "Insert votes here in figures," an instruction which one would think was plain enough for anyone to comply with; yet some *write* the number of their votes in words, others put *crosses*, others again put the number in the wrong columns, and even to the left of the list of names. Some only give away a portion of their votes; others are much more liberal, for having, say, only two votes to dispose of, they give votes to each of four, five, and even six candidates; one gentleman with seven votes, kindly distributed twenty-eight votes as follows:—1, 2, 3, 4, 5, 6, 7, whilst another with ten votes gave one to each of eight candidates and two to the ninth, thus he nullified all his votes except one, but caused the scrutineers to make twenty-seven separate entries. Finally no less than fifty-four voters neglected to sign the voting paper with their name and address and 2186 omitted sending in their papers at all.

In conclusion, I may say I have no especial interest in either of the candidates but have been

A Scrutineer for several Years.

W. F. G.—See before, pp. 90, 156, and 510.

J. Hickling.—(1) Fresenius's 'Quantitative Chemical Analysis' (Churchill's). (2) Distil the ammonia into pure water.

X. Y. Z.—The article you refer to is a proprietary arsenical preparation; the London agents for it are Messrs. Schacht and Co., Finsbury Pavement.

Y. L.—The mixture should be perfectly clear and colourless. The precipitate can be accounted for only on the supposition that the liq. ammon. acet. was so alkaline as to neutralize the acid in which the quinine had been dissolved.

Communications, Letters, etc., have been received from Johnson, Hunn, Barnard, Clayton, Finch, Wells, Garry, Proctor, C. E., Ajax, Nemo.

TRADE MARK.

LYNCH'S

PRIZE MEDAL, SYDNEY, 1879.

ENEMAS

SUBJOINED ARE PRESENT PRICES:

		£	s.	d.
433A.	HIGGINSON'S, unvarnished india-rubber, with rectum pipe only, in stout hinged cardboard box. ... ... per doz.	1	4	0
433B.	Ditto, with elastic-gum vagina pipe and leather shield ... ... „	1	9	0
434.	Ordinary Higginson's, barrel shape, with bone rectum pipe, elastic-gum vagina pipe, to plug on, and patent leather shield, in slide cedar box ... ... per doz.	1	12	0
434A.	Ditto, ditto, with disconnecting mounts ... ... „	1	14	0
435C.	LYNCH'S, requiring no metal mounts, in one continuous piece, *warranted not to split*, fitted with vulcanite rectum pipe, in slide cedar box ... ... per doz.	1	10	0
435D.	Ditto, with elastic-gum vagina pipe, and leather shield, in slide cedar box „	1	15	0
436.	LYNCH'S FAMILY (Higginson's principle), fitted with bone bulb-pointed rectum pipe for adults, elastic-gum vagina pipe, and elastic-gum rectum pipe with bone shield for children, in mahogany box... ... ... per doz.	2	8	0
437.	Ditto, in slide cedar box ... ... „	2	3	0
437A.	LYNCH'S PERFECTION, in mahogany box ... ... „	2	17	0
437B.	Ditto, in slide cedar box ... ... „	2	10	0
437C.	Ditto, in superior mahogany box, with lock and key ... „	3	12	0
437D.	Ditto, in oval boxes of cloth and leather ... ... „	2	15	0
437E.	LYNCH'S COMPLETE HOUSEHOLD SYRINGE, consisting of Higginson's Enema with disconnecting mounts, fitted with bone bulb-pointed rectum pipe for adults, elastic-gum rectum pipe with bone shield for children, elastic-gum vagina pipe, and bone pipes for ear, eyes, and nose, in mahogany box ... ... each	0	7	6

Discount—10 per cent. Monthly, 5 per cent. Half-yearly Account.

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EXTRACT OF MEAT,

According to analysis, is the best. Prepared at the Company's own Works, Santa Elena, South America. Sole Agents, ROCKWOOD & Co., 12, Long Lane, E.C. Agents required.

Dr. ARTHUR HILL HASSALL, M.D.: "*Possesses an advantage over similar preparations, containing a relatively smaller amount of water and a greater proportion of solid constituents of Meat.*"

Mr. CHARLES H. PIESSE, F.C.S., Public Analyst:—"As the result of my careful examination of the Extract of Meat (E. Kemmerich & Co.), I find it to be absolutely pure. It contains a very large percentage of solid constituents of Meat. The nutritive value is of the highest order."

DINNEFORD'S FLUID MAGNESIA.

Perfect in Purity and uniform in Strength.

"Dinneford's Solution may fairly be taken as a type of what the preparation ought to be."—*Pharmaceutical Journal.*

Sold by all Wholesale Druggists, and by the Manufacturers,

DINNEFORD & CO., Pharmaceutical Chemists,

180, NEW BOND STREET, LONDON.

Great Saving in the purchase of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.

Before ordering the above see our newly Reduced Price List, which is forwarded free on application; also for Blue Poison Bottles, Round Shouldered Phials, Castor Oil Bottles, Flat Pannelled Bottles, Direct Square Dispensing Bottles, Citrate of Magnesia, Essence Bottles, Pomade Bottles, and all other kinds.

ESTABLISHED UPWARDS OF FIFTY YEARS.

TASTELESS PILLS

(COX'S PATENT.)

Dated and Sealed April 13, 1854.

Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s. and Compound Rhubarb at 7s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if stamps or P.O.O. are remitted with order.

Twenty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 500 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**

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These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

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AND

TRANSACTIONS

HAS A

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(The LARGEST BONA FIDE Issue of any Journal addressing Chemists and Druggists.)

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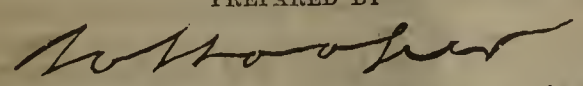

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A real aperient, mild and constant. Dose, ʒij. to ʒiv., diluted.

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Exhausted entirely with cold water, and prepared by a process specially devised to avoid the changes inseparable from prolonged evaporation. Dose, 10 to 20 drops, diluted.

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N.B.—Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

At the Major Examination held this month, **3** Students were sent in from this College, **2** passed.

* Mr. A. NICHOL. | * Mr. T. RICHARDS.

* These Gentlemen passed both Minor and Major from this College AT THEIR FIRST ATTEMPT.

The Pass List of Minor Students will be published next week.

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Certificates of Merit.
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„ B. RICHARDS.
„ J. SENIOR.

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Bronze Medal.
Mr. R. J. YOUNG.
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Mr. W. G. BLACKHAM
" W. F. GOODWIN
" F. E. EASTWOOD

On December 19th and 20th, Two Students were examined. The undermentioned passed :—

Mr. ISAAC
" E. RYLEY

The next Session will commence on January 8th, 1883, and Mr. TURNER fully intends to do all he can to maintain the high name which his School now holds for *thorough, straightforward* and *successful work.*

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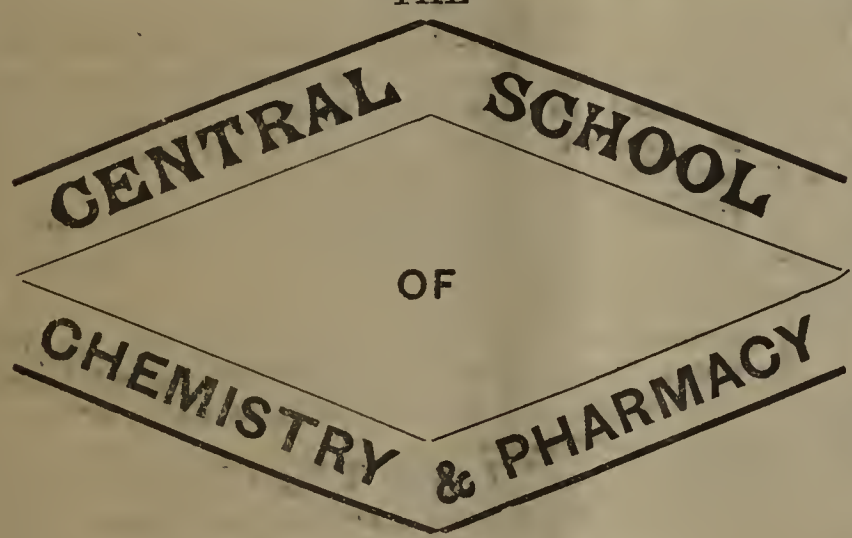

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Advertisers are requested to observe :—

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2.–That replies to Advertisements addressed to initials or fictitious names, at Provincial or other Post Offices, being contrary to regulations, are detained in the London Post Office, and do not therefore reach their intended destination.
3.–That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN,**" and must be sent only to the Publishers,

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CHEMICUS requires a responsible situation in Warehouse, Factory, Chemical Works, or suitable Employment. State salary. 9, Queen's Parade, Brandon Hill, Bristol.

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ADVERTISER, who is at present on the Gold Coast, desires engagement in or near a Hospital or Medical School in any part of the United Kingdom. Services in lieu of board and lodging, with time for attending lectures. Has had 8 years' experience in the Dispensing of medicines, &c. Good reference. AFRICA, 28, Holford Sq., London, W.C. N.B.—Replies cannot be acknowledged in less than two months.

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SENIOR ASSISTANT. Must be acquainted with first-class London business. State age, qualification, previous engagements, and salary required, in confidence. Letters not replied to within one week may be considered declined with thanks. Apply, A. SENIOR, care of Orridge & Co., 32, Ludgate Hill, E.C.

EARLY in January.—A steady industrious ASSISTANT, age about 24. One who has passed the Minor and is accustomed to first-class Retail and Dispensing will be preferred. Apply to W. H. SYMONS, Chemist, 2, Queen's Ter., St. John's Wood, N.W.

A GOOD JUNIOR, accustomed to Dispensing. State age, height, and all particulars. X. Z., 5, Blandford St., Portman Sq., W.

AN ASSISTANT, well up in Prescribing and Extraction of Teeth. Gentlemen of active business abilities only need apply. J. B. & Co., Messrs. Baiss Bros., 4, Jewry St., Aldgate, E.C.

AN ASSISTANT. About 22 or 23 years of age. Accustomed to a first-class Dispensing business. Preference given to one who has some knowledge of the French language and pharmacy. Address, S. J. WESTON, Pharmaceutical Chemist, 151, Westbourne Terrace, London, W.

A JUNIOR ASSISTANT. About 22 years of age. Accustomed to good Dispensing and Retail. Apply, stating age, height, salary required, and references, to GEORGE BAXTER, Pharmacist, Chester.

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EARLY in January.—A qualified ASSISTANT, from 25 to 30 years of age. Accustomed to first-class West-end business. Apply by letter to W. PLAISTER, 13, Gledhow Ter., South Kensington.

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ASSISTANTS WANTED.

JUNIOR ASSISTANT (in-door) for Mixed country business, towards the end of January. Must be steady, industrious, and of good address. Apply (with photo. if possible), stating age, height, salary required, with usual particulars, to KEMP & SON, Chemists, Horncastle.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 653.] SATURDAY, DECEMBER 30, 1882. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

ELIAS BREMRIDGE, Secretary and Registrar.

NOTICES.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, February 7th, 1883, at Eight o'clock.

The Chair will be taken at half-past Eight *precisely*.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, January 31st, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

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For the Relief of Distressed Members or Associates of the Society of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

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MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 119A, George Street, Edinburgh, in January, April, July, and October, for the purpose of conducting the above Examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

INDEX TO THE PHARMACEUTICAL JOURNAL FROM JULY, 1868, TO JUNE, 1878.

An Index of the ten Volumes of the *Pharmaceutical Journal*, from July, 1868, to June, 1878, has been compiled and printed, price 2*s.* 6*d.*, or by post, 2*s.* 8½*d.* Each Member and Associate of the Society will be supplied with one copy *gratis* on application to the Secretary.

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THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

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CHEMISTRY AND PHARMACY. .....Professor REDWOOD.
On Monday, Tuesday, and Wednesday Mornings, at 9 o'clock.

BOTANY AND MATERIA MEDICA .....Professor BENTLEY.
On Thursday, Friday, and Saturday Mornings, at 9 o'clock.

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AT

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ON WEDNESDAY, 10*th JANUARY,* 1883.

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I. Bourdas
A. W. Flux
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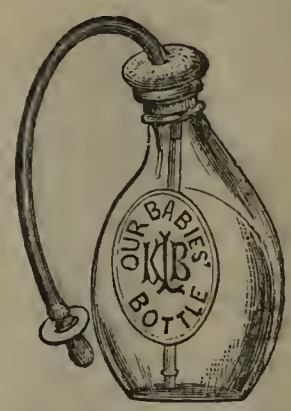

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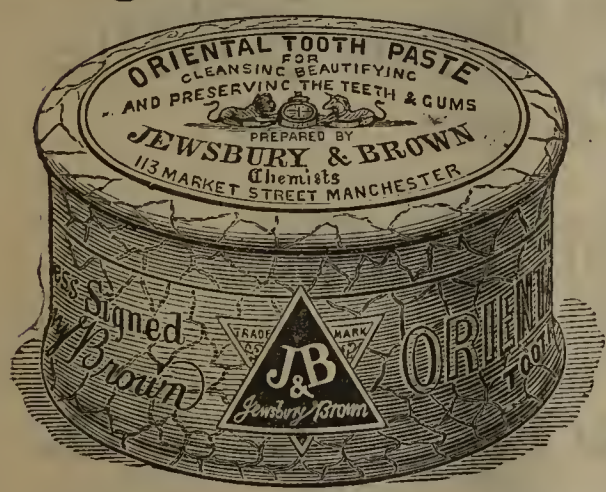

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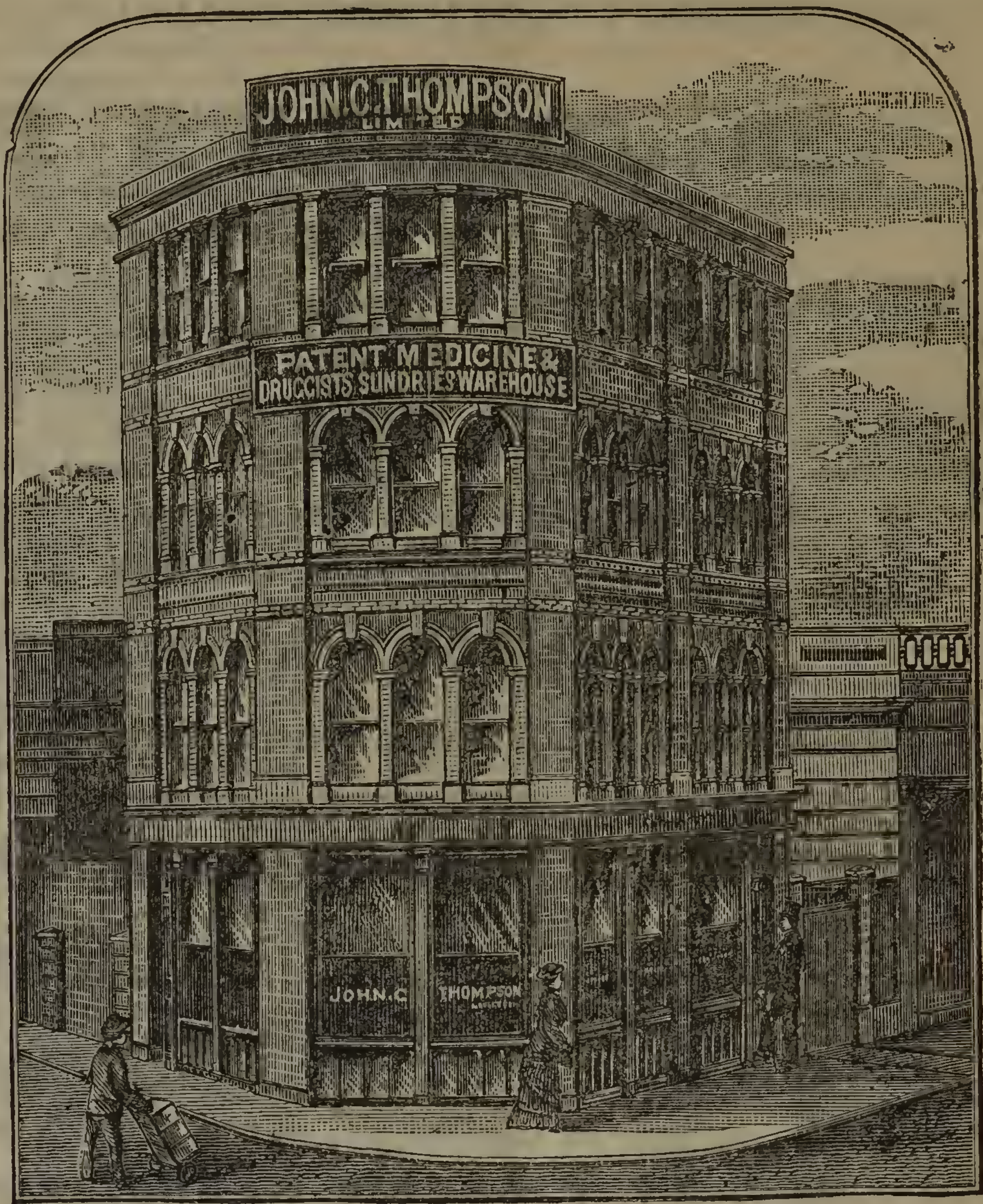

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THIRTEEN PRIZE MEDALS, FIVE GOLD.

"THE MONTH."

The recent work on 'The Colours of Flowers,' by Mr. Grant Allen, could hardly fail, from the elegance and clearness of his style, to attract considerable attention; but the position he assumes of taking useful theories as established truths naturally gives rise to scientific criticism. The editor of the *Gardeners' Chronicle* points out that the great mass of the facts of evolution militate against the acceptance of Mr. Allen's theory that petals are merely flattened out filaments and are developed subsequently to the stamens. Specialization and adaptation do not necessarily indicate lateness of origin in point of time, but are, in fact, the outcome of arrest of development, of a check to progress rather than an advance. Mr. Allen's theory that yellow was the colour of the earliest flowers, and that then in order of time came the white, red, purple and blue flowers, the last-named being the most highly organized, has no better basis than his theory concerning the origin of the petals. In the genus *Linum*, for instance, in which yellow, white, red and blue flowers occur, the blue-flowered species can scarcely be said to be more highly organized than the yellow.

Mr. Meehan, in the 'Proceedings of the Philadelphia Academy of Natural Sciences' (*Gardeners' Chronicle*, Nov. 25, p. 683), makes some interesting observations concerning *Acer dasycarpum*. During a period of fourteen years he found that a female tree would sometimes change the sex and bear only male flowers; also that this change resulted from a greater check to the vegetative force than that required to produce female flowers, and therefore signified exhaustion of vital power. Pursuing his researches he found that although at the time of the fall of the leaf there is little to distinguish a flower bud from a leaf bud, yet the former grows at a comparatively low temperature at which the leaf bud remains stationary, also that male flowers expand at a temperature at which the female flowers remain quiescent. Probably it is for this reason that some trees, like birch, which in countries where vegetation is suddenly developed during the short summer produce both kinds of flowers at the same time, rarely ripen fruit in more temperate climates because the male flowers are likely to be expanded long before the females. It is somewhat remarkable that the trees of *Acer dasycarpum* bearing male flowers were never observed by Mr. Meehan to change their sex to female. These observations may perhaps lead to some practical means of improving the culture of nutmegs, of which, owing to the uncertain sexual character of the trees, the crop is very precarious.

At the meeting of the Royal Horticultural Society, on December 12 (*Garden*, Dec. 16, p. 542), the Rev. G. Henslow gave a lecture illustrating the power of plants to render themselves attractive, independently of, or in addition to the corolla, in proof of which he exhibited various species of *Salvia*, *Poinsettia*, *Epiphyllum*, *Cornus* and *Euphorbia jacquinæfolia*, etc.

An interesting account of a spectroscopic study of chlorophyll, by Messrs. W. J. Russell and Lapaiche, will be found in *Nature* (Oct. 26, p. 637). These observers find that a mixture of 2 parts of alcohol and 1 of ether will extract from green leaves a substance which they regard as normal chlorophyll. The green substance so obtained is a body which very easily undergoes two modifications. Since these are produced by acids, heat and metallic solutions, they are regarded as the result of a molecular change, and not of a chemical one. Weak organic acids such as tartaric, oxalic and citric, cause a change in the spectrum, but this change does not go beyond a certain point. When strong acids, such as sulphuric, nitric or strong hydrochloric acid, are used a further change in the spectrum is produced. The modification produced by vegetable acids is distinguished by the authors as α-chlorophyll, and that produced by strong acids as β-chlorophyll. The authors state also that the spectrum remains unchanged after the yellow body, described by Conrad, has been extracted by benzene, and that hence this substance cannot be considered as a constituent of their normal chlorophyll. Some leaves, such as those of the vine, yield the α-chlorophyll to the alcohol and ether mixture, but this has been found to occur when the leaves are acid through being bruised; if carbonate of calcium or sodium be added, the normal chlorophyll only is detected by the spectroscope. The change from normal to α-chlorophyll takes place naturally in leaves after being gathered, whether in light or darkness. In some leaves, such as those of rhubarb, the chlorophyll evidently undergoes decomposition, the extract becoming of a tolerably bright red colour, and no longer giving the chlorophyll bands. Neither this red substance nor the majority of colouring matters in flowers give visible spectra. When to a solution of normal chlorophyll hydrochloric acid is added it has apparently considerable power of destroying certain bodies which absorb the blue ray, since after its addition blue rays come through where before it was quite dark. When a strong chlorophyll solution is very considerably diluted a striking change of tint from a dark to a light yellowish-green takes place; to this fact, viz., the greater or smaller amount of chlorophyll in a given area, is probably due the difference in shade between young and old leaves. The action of alkalies on chlorophyll produces a modification in which only the dominant band remains visible in the spectrum. This one-banded chlorophyll is much more permanent than the α and β modifications, solutions exposed to the sunlight for three months remaining unchanged in colour and constitution. This modification is also formed when a small quantity of sulphate of copper is added to an alcoholic solution of normal chlorophyll.

It is not unusual to see violets and primroses and other spring flowers blossoming in the mild weather of late autumn, especially if they have been prevented from flowering by having been transplanted at the period of flowering. From some interesting facts stated by Dr. Brandis, in the *Indian Forester* for July, 1882 (communicated by Mr. W. T. Thiselton Dyer to *Nature*, November 23, 1882), it would appear that similarity of season has more to do than the time of year with the time of flowering. Dr. Brandis observed that, from 1845 to 1850, *Acacia dealbata*, one of the Australian wattle trees, flowered in India in October; in 1860, it was observed to flower in September; in 1870, in August; in 1878, in July; and in 1882, in June. In Australia the tree flowers in October, which is the spring month there. In Ootacamund, the corresponding month is June. The tree has thus gradually worked back its time of flowering from October to June, from Indian autumn to Indian spring, during a period of forty years. *Acacia decurrens*, in the same way, appears to have flowered, during May to July, at Kew, in 1790, but now blossoms in February.

At a meeting of the Royal Horticultural Society, on November 16 (*Nature*, November 30, p. 119), some singular monstrosities of flowers were exhibited by the Rev. G. Henslow. One of these was a specimen of Solomon's seal (*Polygonatum officinale*) in which the normal flowers were developed as leafy racemes; another was a violet in which the sepals bore abortive ovules on the margins and midribs. Mr. Henslow also exhibited some drawings illustrating various stages of ovuliferous stamens in the alpine poppy.

In the same Journal Mr. A. M. Stapley, of Owens College, describes the fertilization of *Veronica officinalis*. According to his observations a fly trying to alight on the flower is obliged to clasp the two divergent stamens on account of the vertical position of the flower; this brings the two anthers close together below the pistil, where the front of the fly's head becomes dusted with pollen. The stigma, when mature, droops a little (the flower is proterandrous), so that it receives the pollen deposited on the insect's head. In another species, *V. hederæfolia*, in which the corolla is not so easily detached, the stamens and pistil are close together and self-fertilization appears to be the rule.

Dr. T. F. Hanausek, of Krem, describes (*Zeits. d. allg. öst. Apot.-Vereins*, xx., 465) a new kind of ginger, said to be of Japanese origin, in which the starch grains differ very considerably in appearance from those found in *Zingiber officinale*. This ginger is met with in commerce in the form of compressed pieces, with the flat side pared as if the root had been sliced longitudinally. The colour of the ginger is a light slaty grey or dirty greyish white. At the edge a grey corky bark remains, but sometimes this is absent. The freshly cut surface shows numerous yellow streaks or dots, indicating the vascular bundles, consisting chiefly of scalariform reticulated vessels, and small brown points which are resin cells. The taste and smell resemble those of ginger but are weaker. The starch grains are broadly oval or elliptical, without the point which forms such a marked feature in ordinary ginger, and the concentric rings and hilum are well marked and easily seen. Mixed with these are numerous compound starch grains, with their component parts sometimes separated; these somewhat resemble those of the nutmeg. Nothing resembling these starch grains has ever been found by Dr. Hanausek in Bengal, Jamaica or Africa ginger, and hence he thinks that Japanese ginger must be produced by another species.

In a note read at the Linnean Society, on Nov. 16, by Mr. W. T. Thiselton Dyer "On the Origin of *Cassia lignea*," he remarks that the want of exact evidence as to the botanical source of this spice is now cleared up. Mr. C. Ford, Superintendent of the Botanical Department at Hong Kong, has made an expedition to the districts in which the cassia tree is cultivated, and has brought back herbarium specimens in flower, which prove to be those of *Cinnamomum Cassia*. So far as Mr. Ford could ascertain, cassia buds and leaves as well as barks are obtained from this tree only. The leaves are sent to Canton for the distillation of oil of cassia, and the buds are gathered when about one-eighth grown. The thick bark, so much valued by the Chinese, is obtained from trees reserved for seedbearing, when such can conveniently be spared for the purpose.

Some interesting results concerning the germination of seeds have been obtained by Dr. Liebenberg, and published in the *Journal of the Vienna Academy of Sciences* (*Garden*, Dec. 2, p. 480). He finds that many plants require the presence of lime in the soil during the germination process, and that the seedlings die if it is not present. On the other hand, there are some plants which germinate freely without it. The cinchona trees are known not to require lime, but the frequent failure in Jamaica to raise seedlings, may, perhaps, be due to the soil not containing the other ingredients necessary to their healthy growth.

Several valuable memoirs have recently been presented to the Academy of Sciences upon points connected with the chemistry of vegetation. M. Leplay (*Comptes Rendus*, xcv., 1133) has given the conclusions he has drawn from the analysis of the different organs of maize at three different periods of its vegetation. He has found that at the end of the first period of vegetation (1st July) potash and lime are present in all parts of growing maize, in the soluble state in combination with vegetable acids in the juices, and also in the insoluble state in the tissues. From this time, however, no more potash appears to be taken up from the soil; but that already present in the plant in soluble organic combination undergoes an extraordinary migration from one part of the plant to another. During the second period the growing ear is supplied with potash entirely at the expense of the stalks, which lose as much as 39 per cent. of the quantity present in them at the end of the first period; but in the third period the proportion of this base in the stalks is restored to the extent of about 25 per cent., the reserve drawn upon now having previously been stored up in the leaves. The quantity of potash in the roots is not affected or only very slightly diminished during these movements. On the other hand whilst the total quantity of potash in the plant remains stationary, the amount of lime in organic combination in the different parts of it is increased during the second and third periods (July 1st to September 1st) by about 140 per cent., the first augmentation taking place in the stalks, from whence as the plant approaches maturity it passes in considerable quantity into the ear and especially into the seeds. During the formation of the reproductive organs the potash in organic combination with the tissues is gradually diminished and disappears entirely from the stalks, being replaced by lime. The vegetable acids combined with the potash and lime are considered to have their origin in the carbonic acid taken up by the plant from the soil in the form of carbonate or dissolved in water. According to M. Leplay (*Comptes Rendus*, xcv., p. 895) this transformation is effected by (1) reduction of carbonic acid or elimination of oxygen; (2) condensation or assimilation of carbon; (3) assimilation of the elements of water in the same proportions as they exist in water. Equations representing the manner in which these changes are supposed to take place are given in the paper.

Another memoir, by M. Leplay (*Comptes Rendus*, Nov. 27), throws some light on the relations between the presence of starch and sugar in plants. He found that sugar occurs in the leaves and accumulates in the stem until the moment of the formation of starch in the seeds. It then passes first into the inflorescence to support it, and subsequently into the seeds themselves, where it is replaced by starch. The

function of the sugar would appear, therefore, to be that of furnishing the seeds with the elements of starch.

At a meeting of the Linnean Society on November 2, Mr. W. E. Armit, of Queensland, contributed a paper on "The Native Medicinal Plants of North-West Australia." Among these he enumerated *Erythræa australis*, used as a tonic in febrile complaints; *Careya arborea*, a myrtaceous plant, the leaves of which are used as an application to ulcers; *Grewia polygama*, a tiliaceous plant, said by the author to be very useful in dysentery, he having "never known it to fail in any case, however serious;" *Petalostigma quadriloculare*, a euphorbiaceous plant, the bark of which is used as a tonic in fevers in doses of 10 grs. three times a day; *Datura australis* and *Euphorbia pilulifera*, remedies for asthma. Of the two last, the former is said to be fatal to horses and cattle, the latter has recently been introduced into this country, and appears to be valuable as a remedy for bronchitis as well as asthma.

Dr. A. F. Currier, of New York, has published in the *American Journal of Medical Sciences* (October, 1882) an article on the use of *Eucalyptus Globulus* (*Med. Times and Gaz.*, Dec. 2, p. 666). The oil is said to diminish the action of the heart and the blood pressure, and to act as a stimulant, astringent and antiseptic on mucous membranes. It is also said to destroy entirely the unpleasant smell of iodoform. Dr. Currier speaks highly of its use as a disinfectant and antiseptic in chronic ovaritis and tumours of the breast in removing the fœtor of the discharges and relieving the pain and discomfort.

Doubts have from time to time been expressed as to the solubility of dialysed iron in the juices of the stomach. Dr. Prosser James, in the *Medical Times and Gazette* (December 2, p. 660), remarks "that the metal is really taken into the blood is not to be doubted," and that in five cases of anæmia with diminished corpuscles, as determined by the hæmatocytometer the globules increased rapidly under the use of 90 drops daily, and general improvement went on *pari passu* with this increase.

In the *Therapeutical Gazette* (p. 401), J. M. Blackerly speaks very highly of *Chionanthus virginica* as a remedy in chronic cases of enlarged and indurated liver. He states that in his hands it has proved superior to iridin, leptandrin, euonymin, podophyllin, or phosphate of sodium.

Dr. C. H. Ralfe, in a paper read before the Royal Medical and Chirurgical Society (*Brit. Med. Journ*, p. 1095), gave an account of the results obtained by the use of nitrite of sodium in epilepsy. This remedy is stated by him to possess the advantage over nitrite of amyl and nitroglycerine, of more slowly producing effects which are more permanent. The author remarked that it is necessary to ascertain the purity of the drug, as some samples contained an admixture of nitrate. The dose that is usually given appears to be from 10 to 20 grains. Judging from the discussion which followed the reading of the paper, the new remedy does not seem likely to be received with much favour, and its usefulness would appear to be confined to a certain number of cases in which bromide of potassium is of little service and in which there is a state of low vascular tension.

A remarkable case in which the administration of pilocarpine cured a severe attack of pleurisy is described in the *Practitioner* for December (p. 453). A puncture and three blisters having failed to effectually reduce the pleuritic effusion, a hypodermic injection of two centigrams of nitrate of pilocarpine caused such a violent perspiration and salivation that the patient was entirely relieved in an hour and a quarter.

Some excellent results appear to have been obtained by Dr. Seifert in the treatment of diphtheria by chinoline (*Practitioner*, December, p. 447, from *Berl. klein. Woch.*). Dr. Seifert prefers the pure chinoline to the tartrates, on account of the bad taste and smell of the latter. The chinoline is prescribed in a 5 per cent. solution for painting the fauces, the solvent being a mixture of equal parts of alcohol and water. A new brush of hair or cotton wool is used each time, the old ones being burned. The stinging pain at first produced is succeeded by a sense of comfort and by the ability to swallow, if the throat is washed out with cold water after being painted. The following formula is the one which is prescribed for a gargle:—Pure chinoline 1 gram, distilled water 500 grams, sp. vini rect. 50 grams, and menth. pip. gtt. ij.

Dr. P. Miall (*British Medical Journal*, December 10, p. 1206) recommends the use of sulphocarbolate of sodium in the vomiting of pregnancy, in doses of 7 grains in half an ounce of water.

A French correspondent of the *Medical Press and Circular* (December 6, p. 485) speaks very highly of the local application of chlorate of potash in cancroid affections, such as epithelioma, lupus, etc. He states that a medical man has just treated, in a very effectual and rapid manner, a case of the latter by the application of the salt in powder. The cure was effected in a month although the disease was of five years' standing, and no other treatment was used, although previously many other things were tried.

In an interesting note on "epidermic medication" (*Ephemeris*, p. 152), Dr. Squibb calls attention to the facilities which the oleates dissolved in oleic acid present for this form of treatment and the desirability of more systematic experiment as to their mode of action. He points out that an oleate of glycerine,—olive oil, for example,—when used as a solvent or vehicle for an active medicine, is absorbed or passes through the skin very slowly and imperfectly; but that when the glycerine radical is replaced by a basic medicinal agent and the resulting soap is dissolved in excess of oleic acid, the whole passes rapidly through the skin and the local effect is correspondingly prompt and certain. As illustrating the affinity which oleic acid appears to have for the skin, he states that wood, porcelain and cloth coated with oils, glycerine or oleic acid retain a greasy appearance indefinitely, but that if the skin be similarly treated the oleic acid disappears much more quickly than oils or glycerine. This observation appears to have some bearing upon a recommendation, recently made, to use the definite oleates with heavy petroleum oil for a vehicle.

In connection with this subject it may be mentioned that in consequence of a failure to effect solution of a specimen of Duquesnel's "aconitine cristallisée" in oleic acid, and from the fact that he found it to be soluble in water, Dr. Squibb was induced to examine it more closely. Some of the crystals were dissolved in water and the solution was precipitated with slight excess of normal solution of sodium; the precipitate when carefully washed and dried at about 44° C. weighed only 80·7 per cent. of

the weight of crystals used. The mother liquor, tested physiologically, gave no indications of aconitine, but contained nitric acid equal to about another 8 per cent., making together 88·7 per cent. The other 11·3 per cent. was not accounted for. Dr. Squibb is therefore of opinion that "Duquesnel's crystallized aconitine is not what it purports to be, but is a nitrate of aconitine containing not more than 80·7 per cent. of the hydrated alkaloid."

At a recent meeting of the Berlin Pharmaceutical Association, Dr. Carl Schacht called attention to some specimens of formamide of mercury, a new mercurial preparation recommended by Dr. Liebreich for use in subcutaneous injections (*Pharm. Zeitung*, December 16, p. 764). Formamide is a colourless liquid, boiling at about 195° C., which is a product of the reaction of the ethylic ether of formic acid upon ammonia; it is neutral when pure, but easily becomes acid, and it can only be distilled without decomposition in a vacuum. When a dilute solution of formamide is heated in a water-bath with precipitated mercuric oxide a clear colourless solution of formamide of mercury is obtained, in which sodium hydrate causes no precipitate, and which does not produce a precipitate in a solution of albumen. A solution for subcutaneous use, each cubic centimetre of which represents one centigram of mercury, is prepared by gradually adding 10 grams of formamide to 10 to 13 grams of freshly precipitated well-washed mercuric oxide, gently heated with some water in a water-bath, and as soon as solution takes place, filtering the colourless liquid into a litre flask and filling this up with distilled water. The solution of formamide of mercury keeps well in brown glass and is therefore dispensed in bottles of that colour.

According to the *Sanitary Engineer* (December 14, p. 31) the distilled extract of hamamelis is chiefly prepared in the States of Massachusetts, Connecticut, and New York. For this purpose the small twigs of the witch hazel are collected, preferably in the fall, when the leaves are off, and sold by the farmers to the distillers. Some of the stills employed hold more than a ton of these twigs, together with sufficient water to cover them. Steam heat is used, and from a ton of twigs fifty to eighty gallons of distillate is produced, to which 5 to 10 per cent. of alcohol is added to prevent change. The composition of the volatile substances thus separated has not yet been determined. There remains in the still a dark-coloured very astringent liquid, which is said to be available as a source of tannic acid. The leaves and not the twigs of hamamelis have been made official in the new edition of the United States Pharmacopœia, and the single official preparation is a fluid extract made by percolation with a mixture of alcohol and water.

M. Pasteur has communicated to the Academy of Sciences some interesting results of an investigation he has carried out together with M. Thuiller in connection with a serious epidemic of *rouget* or pneumo-enteritis among pigs in Bolène (*Comptes Rendus*, xcv., 1120). These investigators have arrived at the conclusion that the disease is the product of a special microbe, of such tenuity as to be easily overlooked, which can be readily cultivated outside the animal. In appearance this microbe approaches most nearly to that to which the "chicken cholera" is attributed, but it differs essentially in its physiological properties, since it is without action upon fowls, whilst it is fatal to rabbits and sheep. The inoculation of pigs with an almost inappreciable quantity of the microbe is promptly followed by the appearance of the disease, followed by death. The most important statement is that animals inoculated by a benign modification of the microbe, resulting from suitable cultivation, are not liable to a fatal attack of the disease.

The synthesis of uric acid, which foiled the best efforts of Wöhler and Liebig, has just been effected by Dr. Johann Horbaczewski, of Vienna (*Monatshefte*, iii., 796). It was known that when uric acid is treated with hydriodic acid it splits up into glycocoll, ammonia and carbonic acid. Dr. Horbaczewski has succeeded in reversing this process. Pure glycocoll was finely powdered with ten times its weight of urea (the diamide of carbonic acid), and heated rapidly in a retort on a metal-bath to a temperature of 200° to 230° C., until the liquid, at first perfectly clear and colourless, became yellow and turbid. After cooling the fused mass was dissolved in dilute potash solution, and the resulting clear reddish-yellow solution, after supersaturating it with ammonium chloride, was precipitated with a mixture of ammoniacal silver solution and magnesia mixture. The precipitate was washed with dilute ammonia, and decomposed with potassium sulphide, the silver sulphide filtered off and the filtrate acidulated with hydrochloric acid. Upon concentrating it in a water-bath there was a separation of uric acid, which after purification was obtained as a yellowish crystalline powder, presenting all the characters and having the elementary composition of that body.

Difficulty has been experienced by some experimenters in obtaining the alkaline potassium permanganate solution required in the analysis of water by the ammonia process free from ammonia. Mr. J. Stapleton (*Chemical News*, December 22, p. 284) is decidedly of opinion that the chief source of the ammonia evolved during the preparation of this solution is nitrogenous matter which is present in most commercial specimens of potash and cannot be entirely removed, even by fusion at a low red heat. As a serviceable device for overcoming the difficulty he recommends first that in preparing the potash solution a "hard" water should be used, as the precipitate of calcium carbonate formed by the neutralization of carbonic dioxide in the water apparently carries down with it a large proportion of the organic matter. The solution is allowed to clear by subsidence during twenty-four hours, or if necessary filtered through asbestos. The potassium permanganate is dissolved in a separate quantity of hot distilled water, and the solution when cold is added to the potash solution and the mixture brought up to half the proper bulk with distilled water. The alkaline permanganate solution thus prepared requires further purification, as it is still capable of yielding a comparatively large quantity of ammonia. This is most conveniently effected by distillation, by means of a current of steam generated from non-ammoniacal water passed at atmospheric pressure through the liquid heated on a water-bath, the steam being led almost to the bottom of the retort. The distillate is nesslerized after a few c.c. have collected, and this is repeated until the solution contains not more than 0·005 milligram of ammonia per litre.

Mr. Shelford Bidwell has given an account before

the Physical Society (November 25) of some experiments he made to test the theory of Dr. James Moser that the action of a selenium cell under light is due to the heat rays making a closer microphonic contact between the selenium and the metal electrodes by expanding the material. He has submitted selenium cells to dark heat rays and found their resistance to *rise*. Under light rays, however, their resistance fell. He, therefore, considers that Dr. Moser's theory is erroneous, and that the fall in resistance due to the light rays is the differential result of the rise due to heat and the fall due to the light. He also explained the fatigue of a selenium cell by use as caused by its increase of temperature. When the cell cools again the fatigue disappears.

An interesting account of a selenium photometer constructed by Messrs. Siemens and Halske, of Berlin, appears in the *Electrician* (December 16, p. 100). The idea embodied in the instrument is to get galvanometer readings from optically excited selenium. If experience should prove the reliability of this method of photometry, a valuable instrument will result, free from the "personal" uncertainty that attaches to the best of those in use at the present time.

Professors Ayrton and Perry, at a meeting of the Physical Society, held on December 9, read a paper "On the Resistance of the Voltaic Arc, or the Opposition Electromotive Forces set up." The electromotive force was measured by a voltmeter connected between the terminals of the lamp. Keeping the width of arc constant the electromotive force was found to diminish as the current increased. Keeping the current constant the electromotive force increased rapidly at first with an increasing width of arc, and afterwards more slowly. The authors gave a curve representing the change. About 80 volts are required to produce an arc of ⅓rd of an inch. For further increase of arc electromotive force is therefore proportional to increase of length of arc.

Professors Ayrton and Perry also read a paper on "The Relative Intensities of the Magnetic Field produced by Electromagnets when the Current, Iron Core, and Length of Wire, etc., are Constant, but the Wire differently distributed." In (*a*) case the wire was wound uniformly from end to end; in (*b*) case it was wound from the middle to one end; in (*c*) case it was wound only at both ends; in (*d*) case it was wound only at one end. The field was measured along a line running through the axis of the poles beyond the magnet. Of the above plans, (*a*) gave the strongest field, except at short distances, when (*b*) was best.

ATOMS AND MOLECULES.*

BY BARNARD S. PROCTOR.

(*Concluded from page* 510.)

Chemical action is probably the influence or effect of the force exerted by molecules of one nature upon the motions of molecules of a different nature, and having different kinds of movement; the resulting motion determining the nature of the resulting compound, and the action taking place when the differing molecules come in contact. Or, if we accept the current theory, that the spaces between the atoms in solid bodies is large in comparison to the size of the atoms, instead of saying when the atoms come in contact, we must say when the ethereal atmospheres which surround them, come in contact. The idea that combination is the result of a harmony of some of these molecular movements is supported by the fact, that mechanical union takes place when powdered sulphur and chlorate of potash are powerfully compressed, and that chemical union takes place when they are powerfully rubbed together, the harmony of their molecular motions not being close enough to cause chemical union till the mechanical motion of friction assists, probably by altering one or both of the molecular motions, in such a way as to make them harmonize more closely, or by the mechanical disintegration of particles disturbing the polarities of the simple body, as chemical decomposition effects the nascent state of molecules liberated from chemical union. Friction is said to ignite a match by causing heat. Why not say it causes chemical action directly? We have no evidence that heat is produced *before* the chemical action, except the general experience that heat is one of the results of friction; and no evidence at all that the chemical action observed is due to the heat produced by the friction. We also know that light and electricity are results of friction, and though light is said to be one of the evidences, or consequences of a certain degree of heat, we cannot for a moment admit that light is invariably an evidence of heat or at least of that degree of heat which is said to be luminous, and when, by rubbing two quartz pebbles they shine in the dark, there is scarcely a possibility that any portion of the stone has been raised to the temperature of incandescence. Again if, instead of quartz, we take loaf sugar for the experiment, the sugar would not bear a temperature capable of producing light through the development of a luminous heat. Is it not more philosophical to say—*friction produces molecular motions of various degrees of intensity, which manifest themselves as heat, light, electricity, or chemical action?* In the friction light of quartz the yellow rays preponderate, while in the friction light of sugar the blue rays predominate, and both are no doubt accompanied by that lower grade of molecular motion which is known as non-luminous heat, and possibly also by electricity. The odour of the rubbed quartz may be the result of chemical action, though of what nature we have no evidence; it does not resemble ozone, though it might be a silica compound of a parallel nature.

Assuming that all bodies are endowed with molecular movements, and that their disposition to unite depends upon the harmony of those movements, we may naturally conclude that chemical change will be facilitated by change of temperature. It has been a common saying that heat was promotive of chemical change, but that is a one-sided statement, true only in relation to certain degrees of heat. If we were inhabitants of the sun or some other very hot place, we might note that chemical action was promoted by a reduction of temperature, and that few combinations could be produced without it. The fact is, while a low temperature usually adds to the stability of a compound, when once formed, a high heat prevents the majority of combinations taking place. The aqueous zone, that is the temperature between the freezing and boiling points of water, is the fertile land of chemical change; here combinations and decompositions in infinite variety take place.

It being admitted that the contact of one body will communicate to others of a different temperature, some of its molecular movements—that harmony of these movements causes combination, and want of harmony causes separation, it is not unnatural that the presence of one body may cause sympathetic vibration in another of the same temperature, but of different normal velocity of vibration, and thus bring about combination or decomposition in the manner long known as catalysis. The surface action of charcoal and spongy platinum effecting the union of H and O, is probably of this nature, and the reverse of the way heat effects the same; the latter increasing the molecular movements till they come into

* Presidential Address delivered before the Newcastle-upon-Tyne Chemical Society.

harmony, the former retarding them till another harmony; a different chord produces a like result. The doctrine of catalysis is going out of favour. Fermentation was formerly spoken of as a catalytic process; then it was attributed to the force of vegetable life, but to call it vital force instead of catalytic is only moving the difficulty from one place to another, not getting rid of it. There is too much disposition to get difficulties put a little further away, just out of sight for the time being, and then neglecting them; such, for instance, as the recent endeavour to explain the process of digestion by saying that solution of the food in the stomach is principally due to the action of the living vibrios which always abound under these circumstances; and omitting to explain at the same time what aids the digestion in the stomachs of the vibrios. Perhaps they have no stomachs, so the difficulty of explaining their digestion disappears. There are, however, a number of cases in which the presence of one body affects the chemical action of another, where we have not the opportunity of hiding our ignorance under the statement that the phenomena are due to vital force. The decomposition of peroxide of hydrogen by oxide of silver. The more ready decomposition of chlorate of potash when mixed with oxide of manganese. The decomposition of chlorate of silver into chloride and oxygen by the action of nitric acid. The increased explosiveness of fire-damp in the presence of non-combustible dust, such as calcined magnesia. The solubility of platinum in nitric acid, if first alloyed with a large proportion of silver, and many other cases which will readily occur to you. In some of these there is probably no explanation more ready or more rational than the supposition that the contact of one body influences the motions of the others, and by this means influences their tendencies to combine or separate.

Johnstone Stoney, in the *Philosophical Magazine*, vol. xxxvi., p. 134, estimates the velocity of the oxygen molecules. The pressure of the gas on its containing vessel equals its weight multiplied by the velocity of its molecules. He goes on to say if oxygen be replaced by hydrogen, which has only $\frac{1}{16}$th of the weight under the same pressure, the velocity must be square 16, (16^2) times as great, that is 256 to 1, to account for the same pressure. Feeling conscious of my own deficiency in mathematical training and experience, it is with some hesitation that I criticise this latter statement. If the momentum of O equal 16, that of H at the same velocity equals 1. At 4 times the velocity it equals 4 for each impact; but at 4 times the velocity it makes 4 times the number of impacts in an equal time, and so brings up the resultant force to 16, the force being proportionate to the *square root* of the velocity instead of the square. This velocity is that of the molecule through space from one part of the vessel to another, however small the movement may be; but the internal molecular movements are more regular and minute, and more ready to act upon the waves of light, causing bright spectral lines or absorption lines. The regularity of the motion is shown by the *narrowness* of the spectrum lines; and the complexity of the motion, by the number of lines belonging to any gas, by how many different velocities of undulations are interfered with, and how sharply the interference is limited. He quotes Maxwell to the effect that the free path of a molecule of air equals 7 "eighth metres." That is, a molecule of air between its collisions, moves on the average $\frac{7}{10}8$ (7—one hundred-millionths) of a metre, that is $\frac{1}{9}$th of the wave length of the ray D.

The molecule is deflected 7×10^9 (7 thousand million times) in a second, and each free path lasts $\frac{14}{10}11$ (14 thousand millionths) of a second. This is 50,000 times the double vibration of a red ray, and 100,000 times the double vibration of a violet ray. All the molecular motions affecting light must, Stoney says, vary in velocity only between these limits.

Clausius estimates that the mean distance between the molecules of a gas equal about $\frac{1}{60}$ of the length of their free path. Stoney concludes from Maxwell's experiments that the normal distance is probably about $\frac{1}{10}9$ (1 thousand millionth of a) metre, consequently there are about 10^{18} (a trillion) molecules in a cubic mm. of gas. These statements and such as these may be regarded as knowledge in the nascent state, knowledge which scarcely yet exists, but which is to be. We have been taught that heat is a great promoter of chemical change, but the greater part of the chemical processes with which we are acquainted can only take place at moderate temperatures, that is between the freezing and the boiling points of water. The vital zone of temperature bears a luxurious growth of chemicals. The zone higher is characterized by decomposition and dissociation, the lower zone by stability of compounds, and the formation of some which are easily decomposed by heat.

In physical conditions also the middle or liquid state is the zone of chemical activity; it is here that molecular movements are sufficiently active to facilitate change, and yet kept within the bounds in which the motions of heterogeneous atoms have a probable chance of harmonizing.

Hardness is a physical obstacle to the act of combination of solids, elasticity equally so in the case of gases, though neither of these obstacles are insuperable. Increased temperature (and consequent increased elasticity) facilitates the combination of some gases, probably by bringing their molecular movements into harmony with one another. If an equal number of vibrations per second be added to the motions of two inharmonious musical strings, a point may be reached at which they harmonize. If one string vibrates forty-five times, while the other vibrates ninety-five, they will produce a discord, but if we add five vibrations to each, making fifty and a hundred respectively, the one will sound the octave above the other. An analogous action may enable the movements of two uncombined gases to become so harmonious as to result in their union. The compound motion resulting would then be constant in its character, unless the action of heat be increased so much that dissociation ensues, which would take place if the motion of one of the atoms was acted on by a rythmical heat vibration, which would so far enlarge its orbit as to set it flying off from its companion atom.

The harmony of vibration may be brought about by other agencies than heat or light, such as pressure: increased pressure tending to combine sulphur and copper; reduced pressure facilitating the union of oxygen and phosphorus.

The molecular motion of a compound is probably the result of the composition of the forces of the molecular movements of its elements, but it is not probable that it is so in the simple mechanical sense in which we represent the composition of two forces as the diagonal of their parallelogram; the elements no doubt retain some of their individuality. Professor Mills, of Glasgow, objects to our saying that water contains H_2O (*Phil. Mag.*, January, 1876). He prefers to say that water plus energy equals H + O; and that H + O forms water plus energy. He thinks we might with equal exactness say that water is a simple body intermediate between H and O. If matter were only directed motion as he suggests, the compound water might be only compound in the same sense as the diagonal is the compound in a parallelogram of forces, a simple line intermediate between the two forces H and O; but the conception of motion or force without matter seems to me to require a new definition of matter, or else to require the resolution of both force and matter into motion of luminiferous ether, the existence of which is hypothetical, and the nature of which we assume to be any that suits the requirements of our hypotheses. Had water been a force or motion as simple in its nature as the diagonal in

a parallelogram of force, or as any simple force resulting from the combination of two forces acting in different directions, it would not necessarily be resolvable only into the two forces from the union of which it resulted. The fact that no application of force, varying in kind or quantity, has resulted in the production of anything but H and O from water supports the view of the elements of water retaining their individuality, to some extent at any rate, while in combination, and does not encourage us to regard Aq as a simple body or a simple force intermediate between H and O.

In Ag_2O the union is feeble because the normal movements of the elements are not closely harmonious. In H_2O the union is stable because of a closer harmony. In H_2O_2 the second equivalent of O is feebly held, because the normal movement of O is not closely harmonious with that of H_2O. And Ag_2O, we may suppose, decomposes H_2O_2 because of the harmony between the loosely attached oxygen atoms, continuing in their combination, and because the polarities of these atoms are not better satisfied by association with silver or water than they are by the union of two atoms of oxygen into one molecule, which constitutes oxygen in the free state. This partial satisfying of the polarities by the union of two or more atoms into one molecule, constitutes the difference between the chemical activity of free and nascent elements.

Dr. Siemens has recently propounded a theory of the sun's heat, based upon the fact that the radiant heat and light have the power of dissociating the elements of water when they pass through its vapour in a highly rarefied state, and that the dissociated elements, when drawn down to the denser atmosphere of the sun, reunite, giving out again the heat which had effected their separation. A reasonable objection has been raised to this theory, that is, that the heat which we estimate as the sun's loss is only that which escapes this trap to catch the sunbeams. But, however much heat may escape from the sun into space, it does not seem necessary that we should establish new laws for the conservancy of the solar system. If force radiates from the sun as heat and light against space, diminishing in proportion to the square of the distance from the sun, the same force reflected back from space as from a hollow spherical reflector would come back directly to the sun undiminished. But as space is not a reflector of heat and light, may we not speculate on these overflowing vibrations causing a mechanical reaction, the backward flow of some other force, say gravity? Is it not a more reasonable speculation that gravity should be convertible with the other forces and keep up the cycle of natural change, than that all the stars are pouring forth their heat and light into infinite space, receiving nothing in return, and so to go on till, in the lapse of countless ages, all comes to utter darkness and inconceivable cold? Our common experience is that a hot body tends to become cold, but he would be a bold physicist who would assert that the universe as a whole had the same tendency. On the one hand we have no experience of the universe as a whole, and on the other we have experience of numberless cases where, in ignorance, it was supposed that force was lost, but in which further knowledge showed that it was not lost, but converted into another form. We are as yet unacquainted with any means by which gravity may be converted directly into any force except mechanical motion, but the conversion of the forces is a subject so new, in comparison with the length of time during which the forces have been studied as separate and unconvertible agents, that it would be unreasonable to assume that because we have not yet seen the means of converting the force of gravity into heat or light except through the intervention of mechanical motion, we are not likely to do so. We have converted heat into electricity and electricity into heat—magnetism into electricity and electricity into magnetism, and so on in many other cases, which have been among the most interesting achievements of science during the last half-century.

If the action of gravity be reduced to that of radiant force acting in all directions, the apparent attraction being the subtraction of impacts on that side of a body to which the action of gravity tends to move it, then all bodies must have a diadynamous property at least as perfect as the diaphanous and diathermanous property of air. The proportion of impact force a body transmits, compared to that which it intercepts, gives the difference in weight of a second body weighed above and below the first. The proportion of impact force which a body intercepts, compared to that which it transmits, gives its mass, and the excess of impacts it receives in one direction over the other, multiplied into its mass gives its weight. One very marked difference between gravity and other forces, is that the relationships which an element bears to all the other forms of force are changed by chemical combination, while its relation to gravity remains constant. When iron combines with chlorine, its relations to heat, light, electricity and magnetism are essentially changed, but its weight remains the same. On this exceptional constancy in the relationship between gravity and matter in its different states of combination depends the possibility of exactness in chemical science.

It is with pleasure, not unmingled with reverence, that we feel our views of force and matter extending and promising that we shall see the unity and harmony of all nature. It must be regarded as a narrow view, a small-world prejudice, to look upon our solar system as a centre, radiating force upon all creation, giving out force in the form of heat and light, in quantity inconceivably greater than it receives. Our common experience is that there is a general tendency in all nature to the restoration of physical equilibrium, the bent spring tends to relax, the suspended weight to come to the ground, the hot or cold body to come to the temperature of the bodies surrounding it, and we have naturally assumed, though with too little reason, that a state of rest, of inactivity, of monotony, and of death, is the natural goal to which all things tend.

We do not *know* that our system is becoming colder, and the sun less luminous; and if we did, we still do not know that we are not accumulating some other force, at present beyond our discovery.

On the other hand we are daily becoming more convinced—more *certain* that force is not destroyed.

We are learning to count the atoms, to weigh the imponderable, and to measure that which has neither size nor shape; and we may with hopeful anticipation look for the laws which govern the chemical action of heat and light, and bring gravity into close relationship with the other forces of nature.

THE MEDICINAL OLEATES.*

BY DR. SQUIBB.

Chevreul ('Recherches sur les Corps Gras') discovered oleic acid about 1811, and notices of medicinal oleates may be found in the chemistry and pharmacy of France about that time. The first paper met with in the English language, however, is by Professor Attfield. This is "On a Method of Dissolving Alkaloids in Oils," and is published in the British *Pharmaceutical Journal and Transactions*, for 1862–63, vol. iv., p. 388. This paper refers mainly, but not entirely, to the use of oleates for the purpose of rendering these bases soluble in oil, and both in the paper and in the discussion which followed the reading of it, this use of the oleates was discouraged as tending to useless polypharmacy. From this time nothing very definite has been met with until

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the publication of the paper of Mr. John Marshall, in 1872. Since 1872, very general notice has been taken of the subject, in a casual, inexact way, by authors on therapeutics and materia medica, and several papers have appeared upon the chemistry and pharmacy of the oleates. Various methods of preparation have been advocated, but none so good as the direct union of the acid with the dry base without heating. The preparation should always be either a liquid or a semi-solid which is easily and completely liquefied by the natural temperature of the surface to which it is to be applied, and hence normal oleates undiluted are not applicable to therapeutic uses, but only solutions of the oleates, and these solutions should always be in oleic acid as the solvent rather than in oils, because the acid is more readily absorbed than the oils. In the rare cases where the excess of acid as a solvent of the oleates proves irritant to the skin, dilution with a bland oil becomes admissible. A paper has appeared recently by Dr. John V. Shoemaker (see the *Medical Bulletin* for July, 1882, p. 153), in which it is stated that the oleates as commonly prepared and used are not chemically true oleates, but merely solutions of oxides in oleic acid, and as such will often give negative results. This is a mistake, and is as great an error as it would be to say that mercuric nitrate, made by dissolving mercuric oxide in nitric acid, was not a chemical nitrate, but only a solution of the oxide in the acid. This author also states that the best method of making oleates for medicinal uses is by double decomposition; and this, as a general statement, is also a mistake, as very few oleates are well made in this way, and it is doubtful whether any are best made by double decomposition between solution of oleate of sodium and solution of salts of the bases. At least this is neither the simplest nor the easiest way of making the solutions of the oleates in oleic acid as required for the best and the easiest absorption through the sound or unbroken skin, and it is incorrect to write of preparations made by direct union of the acid and base as "supposed oleates" of "indefinite and unstable character."

The oleates which, up to this time, appear to have been most used, are oleates of aconitia, atropia, mercury, morphia, quinia, strychnia, veratria and zinc. These are for general or epidermic use through the skin, while for special or dermic use in diseases of the skin, oleates of copper, lead and zinc are those most frequently heard of.

Oleates of the more active alkaloids, namely, aconitia, atropia, strychnia and veratria, are usually and properly made of the strength of 2 per cent. of the alkaloid. The oleate of morphia usually contains 5 per cent. of that alkaloid, while the oleate of quinia is made as strong as is practicable, and usually contains 20 per cent. of the alkaloid.

All of these are very simply and easily made by putting the weighed quantity of the alkaloid into a mortar, adding a small quantity of the oleic acid, little by little, and triturating until the alkaloid is completely dissolved. The strong solution thus made is then poured into a tared bottle, and the mortar and pestle rinsed twice into the bottle with small quantities of oleic acid. The proper weight is then made up by the addition of oleic acid. No heat is needed, nor should any be used in the preparation of many oleates, but in some of these the digestion is prolonged, and intervals of trituration are needed. All heating has a great tendency to change their molecular constitution. If well-made oleate of morphia be shaken with dilute sulphuric acid, the morphia should be washed out as a sulphate, but it is a singular fact that it cannot all be so recovered as morphia; yet the morphia effect of the oleate is prompt and decided. This appears to show that some change is effected in the alkaloid even by combining it without heat, while if heated the changes are destructive.

The molecular or combining weight of oleic acid is high, namely, 282, but the weights of the alkaloids are still higher. That of aconitia is 645, atropia 239, morphia 285, quinia 324, strychnia 334, and veratria 592. Hence the molecule of the respective oleates would be very complex and very easily split up by any forces tending to decomposition, as heat, light, etc., or by oxidation from undue exposure to air. Hence it is that oleates may not keep well, but should be as freshly made as practicable, and should not be relied upon for their full effect when more than a year old, even if they have been carefully kept in a cool place.

The normal oleates—that is, when the oleic acid is fully saturated by the base—contain the following percentage of the respective bases:

Oleate of aconitia,	about	69·6	per cent.	of aconitia.
Oleate of atropia,	„	50·6	„	„ atropia.
Oleate of morphia,	„	50·3	„	„ morphia.
Oleate of quinia,	„	53·5	„	„ quinia.
Oleate of strychnia,	„	54·2	„	„ strychnia.
Oleate of veratria,	„	67·7	„	„ veratria.
Oleate of bismuth,	„	22·2	„	„ Bi_2O_3.
Oleate of copper,	„	12·7	„	„ CuO.
Oleate of iron,	„	11·7	„	„ FeO.
Oleate of lead,	„	29·	„	„ PbO.
Oleate of mercury,	„	28·4	„	„ HgO.
Oleate of zinc,	„	1·29	„	„ ZnO.

A brief notice of the therapeutic application of some of these oleates may not be without use. In epidermic medication it must be borne in mind that the skin, in common with the mucous membranes of the primæ viæ, does not absorb with equal facility or rapidity at all times. As was forcibly said by Professor Charles D. Meigs in regard to the occasional inactivity of powdered ergot in parturient women: "There are conditions of stomach in which you might as well put your medicines in a bladder and hang it up on a nail." So there are conditions of skin wherein absorption is slow and difficult, and in all such, hypodermic medication has great advantages, and it is highly probable that the hypodermic use of these oleates would be effective in such cases.

In reviewing the principal oleates somewhat in detail, it may be useful to begin with oleic acid.

Oleic Acid.—This is made from the so-called "red oil" of the makers of stearin candles. The other fatty acids are separated from the oleic by solidifying at higher temperatures, when they can be filtered out. But they are never completely separated, nor is it necessary they should be, since this oleic acid for medicinal uses does not aim at a high degree of chemical purity. The crude oleic acid is next washed with solution of sulphurous acid, and finally is repeatedly washed with water, and carefully filtered in the cold with the least practicable exposure to air.

It is then an oily liquid of the colour of pale sherry wine, having a faint, peculiar, indescribable odour and taste, free from acridity. Its specific gravity is ·898 to ·900, at 15·6° C. = 60° F. It is thinner than the oils, and much more easily wiped off from surfaces without leaving them greasy. Applied to the skin, it wets it almost like water, and if very thinly applied it is so quickly absorbed that it seems as if it had evaporated like water; and it leaves the skin as clean and free from greasiness as though it had been wet with water. The peculiar odour of the acid is much stronger when it is spread upon the skin than when in a bottle. It should be kept from the light and air as much as practicable, although it does not appear to rancidify as easily as fats and oils do. As it has not yet been determined how the oleates keep, it is very good practice to keep the oleic acid on hand, and from it make the oleates as they are required for use—not necessarily each time they are prescribed, but every month or two.

Oleate of Aconitia.—This is made by simply putting the dry alkaloid and the acid together, when the alkaloid, if pure, instantly dissolves and disappears.

This is, however, only the case with the alkaloid precipitated from the "aconitine" of Duquesnel.* With the other aconitias of the market the solution is not quite so prompt, and a little residue is often left undissolved, and has to be filtered out. The oleate should, however, always be made from the best aconitia, although it be thus rendered very expensive. The increased cost is, however, rather apparent than real, since half a drachm of such an oleate is more effective than an ounce made from ordinary aconitia.

There is no pharmacopœial authority for the strength of this oleate, but usage has started it at 2 per cent. That is, 2 grains of aconitia in 98 grains of oleic acid. Then, as the aconitia precipitated from "Duquesnel's aconitine" costs at least forty cents a grain, the 100 grains of this oleate would cost say eighty-two cents. But the preparation is an exceedingly active and potent one, and is, therefore, required in very small quantity. Remembering that the dose of this aconitia for internal administration is from the one-hundredth to the two-hundredth of a grain there will be at least three hundred doses in 100 grains of the oleate. Hence it will be required, in any probable use of it, in very small quantity, and as it must be a very dangerous substance, it should never be put up or dispensed in larger quantity than about the sixteenth of a fluid-ounce, or 2 cubic centimetres, and this quantity would contain the eighth of a grain. Each minim weighs eight-tenths of a grain, and contains about one-sixtieth of a grain of aconitia. A drop from the thin lip of the vial in which it is dispensed is about half a minim.

This oleate should be applied by means of the end of the cork which stops the bottle containing it. If twice the quantity which the end of the cork will carry be spread over about half a square inch of the skin on the back of the hand, a glow of warmth in the part is almost immediately felt. This will continue for some minutes, then become intermittent, and in a half hour will have entirely disappeared. If twice this quantity be then applied to about a square inch of surface, including the first portion, the glow will be more pronounced, and there will be prompt tingling in the nerves which pass under the part down to the ends of the fingers. In a few minutes the glow will have increased to a sense of heat and pricking in the part, and the tingling along the course of the nerves will have increased. In a quarter of an hour there will be slight numbness in the ends of the fingers to which these nerves are distributed. All these sensations will increase slightly and steadily for about half an hour, and will then subside, becoming intermittent with longer intervals, until they disappear at about the end of an hour, when the oleate will have nearly disappeared from the surface. If, however, at the end of half an hour the dose be repeated on the same surface, all the sensations are promptly increased and extended to the whole hand. In a quarter of an hour a slight glow of warmth is felt throughout the arm, with just perceptible intermittent tingling. This tingling was noticeable with widening intervals for at least ten hours, and on the following day there was itching of the surface.

This much may serve to show the potency of the preparation, and to indicate both the dose and the use. If in trigeminal neuralgia such an application of this oleate be made over the course of the branch involved, or over the point of emergence and distribution of the nerve, it will probably soon do all that aconite can do for the case in a better, safer and more manageable way than by internal administration. The active medication of the whole organism to get at a local nerve at a point of pain seems to be a roundabout way when access can be had directly to it by such means as this oleate, while at the end of a few hours of the above-mentioned experiments it seemed quite plain that the aconite influence had extended to the entire organism, for the sensations were distinctly felt in the opposite hand, and although the temperature and pulse were not taken, they were evidently both reduced.

Oleate of Atropia.—This oleate is made in exactly the same way as the oleate of aconitia, and by general usage is of the same strength, namely: 2 per cent. Although an active and potent preparation, it is by no means so active or dangerous as the oleate of aconitia. It has been said that the application of 5 minims of this oleate to a knee-joint of a adult patient has produced dilatation of the pupils within a quarter of an hour just as a very good belladonna plaster should do, with prompt relief of pain, and if this be true it serves well to indicate the power and the dose of this oleate. There is, beside, considerable loose and scattered testimony to its steady though slow effect upon the pupil when applied in the neighbourhood of the eye. It would seem that it ought to be very manageable and very useful in ophthalmology as a substitute or alternate for instillation of the watery solution, but up to this time it has not attracted much attention so far as any published statements go. Yet there is a good deal of it sold, and judging by the sales its use is increasing, probably mainly as an application to painful joints as a substitute for belladonna plasters.

Each minim contains about one-sixtieth of a grain of atropia, and a drop from a common 1-ounce vial is about two-thirds of a minim, or from a homœopathic vial with thin lips about half a minim, or one one-hundred and twentieth of a grain.

Oleate of Morphia.—This is made precisely as the preceeding oleates, except that as the morphia of the markets is in crystals, their solution in oleic acid is slow, unless the crystals be rubbed into powder before adding them to the acid in the bottle in which the solution is to be made. A little agitation is then all that is needed. This is the only one of the oleates of the alkaloids that within a short time changes much in keeping. When the elements of it are first put together the solution begins to grow darker, and this change progresses until within a year it becomes very dark indeed. This change in keeping does not destroy its efficacy, but whether it diminishes it or not has not been shown. This oleate was introduced by Mr. John Marshall, who made it of the strength of 5 per cent., or 5 grains of morphia to 95 grains of oleic acid, and this strength has now been generally adopted. This oleate is quite largely used, and yet very little accurate information or observation in regard to it has been published in the ten years that have passed since its introduction. Several good observers within the writer's personal knowledge have occasionally used it for some years past in special cases, and with alleged success, especially as an anodyne and sedative in infants and children. Five to ten minims applied to the abdomen under oiled silk seems to be about the usual dose for children of one to four years.

As a simple sedative hypnotic it is often applied to the inside of the thighs and arms of infants, one or two drops spread over a large area in each locality so as to get not more than four or five drops in all for infants of six months. It should be dropped on to the surface with care, and be spread by the ball of one finger, and as sometimes the absorption is slow the dose should not be repeated within an hour if the first one be insufficient. It is said to have less tendency to constipate than any other opiate. Each ordinary drop contains nearly $\frac{1}{20}$ of a grain of morphia. It is probable that this oleate should be doubled in strength.

Oleate of Quinia.—This, although it has not attracted general attention, is probably one of the most important of the oleates. From the larger quantity of quinia needed in medicine this oleate is made as strong as possible. While a normal oleate of this alkaloid would by calculation contain about 53 per cent. of the alkaloid

* This "aconitine" is a nitrate of aconitia, and requires to be precipitated and dried. As sold under the the name of "Duquesnel's aconitine" it is entirely insoluble in oleic acid.

it has been found impracticable to dissolve that quantity in the acid. In a series of experiments made some years ago when this oleate was introduced, it was concluded that 25 per cent. was the best proportion. But as the quinia of the market holds some hygrometric moisture, it is better to take 26 grains of the alkaloid and 74 grains of oleic acid as the formula. The alkaloid is simply rubbed to powder, and added to the acid in a bottle. Like the other alkaloids this dissolves so readily that, being in much larger proportion, it is liable to clog together and be slow in dissolving. But this clogging together is easily broken up by means of a glass rod. Or the solution may be effected in a capsule and the clogging be prevented by a pestle. In this way it is easily made in a very few minutes. A fluid ounce of this oleate weighs about 410 grains, and, therefore, contains about 102 grains of quinia, which is equivalent to about 140 grains of the ordinary sulphate of quinia. Therefore, a fluid drachm contains the equivalent of about 17 grains of the sulphate, and a minim is equivalent to a little more than a $\frac{1}{4}$ of a grain. A hypodermic injection of a fluid drachm will, therefore, carry the equivalent of 17 to 18 grains of sulphate of quinia.

It happens, perhaps oftener with the administration of quinia than most other medicines, that the physician wants to save the stomach. And many conditions need quinia when the stomach will not accept it, or will not utilize it if given by the mouth. These circumstances have long indicated the hypodermic use of quinia, but up to this time no solution has been proposed that is well adapted to hypodermic use, first, because of the large dose required, and again, because of sparing solubility of available quinia salts. Hence this oleate has been sometimes used hypodermically, but with what success is unknown to the writer. The epidermic use, however, is of late not uncommon, and since it was first proposed occasional trustworthy testimony from private sources has led the writer to consider it an important adjunct to the more common methods of using quinia. The quantity of oleate needed here is considerable, often amounting to 1 or 2 fluid drachms. Hence it should always be applied under oiled silk or gutta percha tissue. When put directly on the skin a minim will require about 4 square inches of surface or it will run, and a fluid drachm would require about 2 square feet of surface, an area hardly accessible under ordinary circumstances. But two pieces of very thin fine old muslin or linen, 6 by 9 inches, will easily hold $\frac{1}{2}$ a fluid drachm each, and may be applied to the insides of the thighs, covered by oiled silk. This leaves the abdomen available for another similar application if desirable, and the oleate can be renewed on these places as rapidly as it is absorbed. Another good way of applying it, especially in walking cases, to get a moderate continuous effect, is to anoint the spinal tract for an inch or more on each side of the spinous processes morning and evening with a $\frac{1}{2}$ fluid drachm, and cover it with a strip of oiled silk under the clothing. The writer has heard of several instances in which ringing in the ears was speedily produced by such applications of the oleate.

Oleate of Strychnia.—This is made exactly in the same way as the oleate of quinia, the crystals of the alkaloid being simply rubbed to powder and added to the acid in a bottle, the solution being promptly and easily effected.

In strength this oleate has been generally made 2 per cent., that is, 2 grains of strychnia to 98 grains of oleic acid; but of course it may be as easily made of any desired strength, short of the saturation of the acid.

When of 2 per cent., each minim will represent about $\frac{1}{60}$th of a grain of strychnia, and a drop will represent from one-half to two-thirds of this quantity, according to the thickness of the vial lip from which the drop falls.

This should be a very effective way of using strychnia, but it has not yet come into use to any extent. For application to the temples in the treatment of some eye diseases, it would seem to be better adapted than the present mode by hypodermic injections, because the effect would be more prolonged and more permanent. That is, the strychnia would remain in the neighbourhood of the nerves to be affected by it for a longer time, and the application could be more easily made.

The general effects of strychnia would doubtless be as easily obtained by this oleate as in the instances of the other alkaloids.

Oleate of Veratria.—Made in exactly the same way as oleate of strychnia and of the same strength, namely: 2 per cent., the minim representing the $\frac{1}{60}$th of a grain.

This oleate has been more used than many of the others, and generally as a local application in the various forms of neuralgia. It is much weaker than aconitia, and as it is applied to similar uses much more of it is required. It should, therefore, be made much stronger or as strong as the skin would bear it. Probably 10 per cent. would be much better than 2, and would make the preparation more serviceable, as then a sufficient dose could be applied without involving too great a surface. If of the strength of 10 per cent. the effective dose would be much more manageable, and more nearly parallel with the oleates of aconitia and atropia; and it would then have more chance of sustaining its reputation for controlling some cases of neuralgia which resist the action of aconitia.

These oleates of the alkaloids are all fluids and should be, as their application demands an accuracy of dose easily attained by minims or drops, but not so easily attained if they were semi-solids; but the oleates with metallic bases do not need such accuracy of dose, and are best dispensed and applied as soft ointments.

Oleate of Copper.—This should be made to contain at least 5 per cent. of oxide of copper, but it may be made of normal strength, that is, containing 12·7 per cent. of oxide. The 5 per cent. oleate is liquid when first made, but soon acquires a kind of semi-gelatinous consistence. It is very easily made by simply adding the oxide and acid together in a bottle. In the cold the solution of the oxide is slow, requiring two or three weeks and frequent agitation. When warmed, however, a few hours only is necessary. The resulting oleate is of a beautiful dark-green colour, and appears to keep well.

It has been used solely in dermic medication, that is, in treating skin diseases, so far as is known to the writer, and its value is not known.

Oleate of Lead.—This oleate, in order to be of a proper consistence, should contain 20 per cent. of oxide of lead. The oxide dissolves slowly in the cold, but more easily and rapidly when warmed to about 66° C. = 150° F.

It forms a yellowish unguent, and is used only in skin diseases, so far as is known to the writer, and very little testimony in regard to its uses or value has been met with.

Oleate of Mercury.—This is the oldest and, perhaps, the most important of the oleates, perhaps because it has been most used, and, therefore, its effects and uses are best known. As introduced by Mr. Marshall it contained 6 per cent. of oxide of mercury, and this strength is still the one most requently used; but a strength of 10 per cent. has also been largely used, and more recently one of 20 per cent., which latter should and probably will soon supersede the others. Either strength is easily made by simply putting together the yellow oxide of mercury and the acid in the cold, and waiting until the solution takes place, stirring occasionally. All heating should be avoided in making this oleate, even the heat of the combining elements being probably hurtful. Time and patience easily effect the combination, but even with the greatest care the weaker or more liquid preparations do not keep well. In a few weeks a film of metallic mercury shows itself at the bottom of each vial, and in a few months this film will represent about 1 per cent. of the mercury used. From this circumstance it has been the practice of the writer to always put up both

the 6 per cent. and the 10 per cent. with 1 per cent. excess of the oxide to compensate for this decomposition, so that the practitioner will really get the strength called for by the label if the preparation be not very old, and be well protected against heat and light. These strengths can, however, never be very accurate, because the decomposition though slow begins early, and probably continues indefinitely or until all the mercury is reduced. When made of the strength of 20 per cent. however, this decomposition does not occur, or at least does not occur to any practically hurtful extent. Of a sample that had been made three years 19 per cent. was soluble in ether, thus showing that it keeps well, while the others do not. It is a very soft solid, like very soft butter, but yet solid enough to prevent all circulation among its particles, and it is probably to this condition that its superior keeping properties are due. Because it keeps so well and the other strengths do not, it is the only oleate of mercury that should be used. Its greater strength is no valid objection to its application, as it is only necessary to apply so much less of it. Or if not easily enough controlled in that way, it can be diluted at the time of using to any definite strength with olive oil, or preferably with oleic acid.

No reduced mercury has ever been noticed in any well made oleate of this strength.

The uses and applications of oleate of mercury are now too well and too generally known to need repetition here. Suffice it to say that by its epidermic use the most prompt, the best and the most easily controlled mercurial impression can be obtained, whereby a remedy often dangerous has been rendered, under proper skill and care, comparatively harmless or altogether beneficent in a very large number of cases which cannot be very successfully treated without mercurials.

Oleate of Mercury and Morphia.—This double oleate was also introduced by Mr. Marshall, and, therefore, is among those which are oldest and best known. The formula generally adopted and most used has been 10 per cent. of the oxide and 2 per cent. of morphia. The morphia was at first used to correct or control the irritation of the skin from the application, but it was found to give a decided anodyne effect in painful joints, etc., while the tendency to irritate has been largely corrected by the use of a better oleic acid. The preparation, however, does not keep well. A specimen made in 1878 is now almost black in colour, with a very considerable film of reduced mercury at the bottom of the vial. It is highly probable, however, that a 20 per cent. oleate of mercury would dissolve 5 per cent. of morphia and make a better preparation which would keep much better. Small quantities of such a preparation could be much better applied than the larger quantities of the weaker one.

Oleate of Zinc.—A 20 per cent. oleate of zinc is not unfrequently spoken of and asked for of late, and a preparation is sold as such. But as a normal oleate of zinc only contains the equivalent of about 13 per cent. of the oxide, such a preparation can only be a mixture of oleate and oxide. It is generally in the condition of a dry, soapy, granular powder, and not susceptible of easy application for absorption even in skin diseases, but only applicable as a surface powder. For appropriate therapeutic use as a zinc preparation it should not be stronger than 5 per cent. When of this strength it is a soft solid of proper consistence for easy application in diseases of the skin. Of this strength it is well adapted to become a very useful preparation, but as yet its uses have not been very definitely stated.

Several other oleates have been mentioned as available for medicinal uses, and possibly some of them may be found useful, but as yet there is no accumulation of testimony in regard to them. Those occasionally heard of are oleates of aluminium, arsenic, bismuth, iron, nickel and silver, but the latter is an impracticable, if not an impossible, oleate.

COMMERCIAL OIL OF THYME.*

BY J. S. LEMBERGER.

Oil of thyme of commerce is said to be very often deprived of its thymol. Is this statement true?

In experimenting with oil of thyme, in answer to this query, we have taken for granted that the declaration made by A. W. Gerrard, who ably investigated thymol, its sources, manufacture and application as an antiseptic agent, was justified by his researches. He is credited with saying, oil of thyme is said to yield as much as 50 per cent. thymol on the Continent. We, therefore, hoped to obtain from pure oil of thyme, if not 50 per cent., at least a considerable percentage of thymol. The writer purchased nine separate lots of oil of thyme from as many different houses in New York and Philadelphia. Only one of these, however, is known to have been distilled in the United States, and this one only we feel warranted in vouching for as a pure distillate of *Thymus vulgaris.* The experiments we conducted in the following order:—

No. 1 was bought as pure red oil of thyme, and yielded 1·67 per cent. of dark crystals.

No. 2 was bought as pure white oil, and yielded 6·67 per cent. lighter coloured crystals.

No. 3 was bought as pure red oil, and yielded 16·67 per cent. of dark crystals.

No. 4 was bought as pure white oil, and yielded ·80 per cent. of light-coloured crystals.

No. 5 was bought as pure white oil, and yielded ·42 per cent. of light-coloured crystals.

No. 6 was reported as very old white oil, and yielded also only ·42 per cent. of light-coloured crystals.

No. 7 was bought as pure French red oil, and yielded 7·92 per cent. dark crystals.

No. 8 was the undoubted American white oil, four months old, distilled from dried French herb, and yielded ·84 per cent.

No. 9 was a dark red oil, rich in colour and very odorous, obtained direct from the importer, and this yielded 38·75 per cent. dark-coloured crystals.

The process used by the writer for separating the thymol consisted in treating the oil with a twenty per cent. solution of pure caustic soda, and, after separating the solution of thymolate of sodium formed, treating this with ether, which, on evaporation, yielded the thymol in the form of irregular crystals. That obtained from the dark oils was dark in colour; that from the white oil much lighter.

Another process was employed upon portions of the same oils to prove the former experiments, viz.: that of treating the oil with caustic soda, then separating the alkaline solution and adding to this hydrochloric acid so long as the supposed thymol separated or rose to the surface as a float. The float was separated by filtration, and weighed after drying; the estimate made appeared to be about the same.

The last process is not so satisfactory, although undoubted crystals were detected as in the first, and numerous minute crystals were found adhering to the vessel, which appeared to be the same under the microscope as those obtained by the former process. The odour of this float in some cases, and more so that obtained from the oils yielding the least percentage of the crystals, was very suggestive of the action of acids upon turpentine, giving rise to a peculiar empyreumatic odour, and corresponds closely with a product described by Gerrard as obtained by him, as being "12 per cent. of oily matter, differing to such an extent in colour, odour, and look from thymol that he could not pronounce it as such."

We observe that the dark oils seem to be the richest in thymol.

* Read at the meeting of the American Pharmaceutical Association held at Niagara Falls, 1882.

The experiments as made seem to justify the declaration suggested by the query that very little of the oil of thyme of commerce is pure, but in all probability is first deprived of its most valuable constituent by manipulations before it is thrown upon the market.

In the discussion which followed the reading of this paper, Mr. Sloane, of Indianapolis, mentioned that thymol is excellent to disguise the odour of iodoform.

Professor Maisch stated that a considerable proportion of the thymol remains in the terbene. It should be produced by fractional distillation. It can be obtained from the American product in considerable quantities.

Mr. J. A. Lloyd said he had failed to get enough thymol from the commercial oil of thyme to pay for the trouble of preparation.

Professor Remington stated that possibly the manufacturers found the sale of thymol so profitable that they make that and sell the residue as oil of thyme.

Professor Bedford stated that the price of oil of thyme is so low that there is now no pure oil of thyme on sale except a brand known as white oil, which is sold at four times the price of the ordinary, the one selling for 55 cents and the other at 2 dollars.

Professor Maisch stated that the herb should yield a larger proportion of thymol than can be obtained from oil of thyme. It may be that the plants grown in different localities yield a different amount of thymol. The amount of thymol does not increase with the age of the oil of thyme.

CURCUMIN.*

BY C. L. JACKSON AND A. E. MENKE.

This substance, the yellow colouring matter of turmeric, has been examined by several chemists, whose experiments have led to the conclusion that its formula is either $C_{10}H_{10}O_3$ or $C_{16}H_{16}O_4$; that it melts at 172°; forms red-brown salts with alkalies; is converted by boric or sulphuric acid into rosocyanine; by reduction with zinc-dust into an oily body; by oxidation into oxalic or terephthalic acid; and by fusion with potash, into protocatechuic acid. The experiments of Jackson and Menke have, however, led to results differing in many respects from those above detailed, which were probably obtained with impure preparations.

The curcumin used in the authors' experiments was prepared by treating ground turmeric root (Bengal or Madras) with light petroleum to remove turmeric oil, and then with ether, which dissolves the curcumin together with a large quantity of resin; and it was finally purified by crystallization from alcohol. The quantity of curcumin thus obtained was only 0·3 per cent. of the root; the total quantity contained in the root is, however, much larger, as a considerable amount remains mixed with the resinous impurities, and some also in the oil.

Curcumin thus prepared crystallizes from alcohol in stout needles, appearing on microscopic examination to be made up of well-formed prisms with square ends, or in spindle-shaped crystals often arranged in radiate groups. It has an orange to yellow colour, according to the size of the crystals, with a beautiful blue reflex: its solution in ether exhibits a strong green fluorescence. It is inodorous when pure; melts at 178°, apparently with decomposition. It is nearly insoluble in water, somewhat soluble in cold, more readily in hot ethyl and methyl alcohols, more soluble in glacial acetic acid, less in ether, very slightly in benzene and carbon bisulphide, and all but insoluble in light petroleum. Strong sulphuric acid dissolves it with a fine reddish-purple colour, gradually changing to black from charring; the same effect is produced, though more slowly, by strong hydrochloric acid. Curcumin dissolves readily in alkalies and alkaline carbonates, to a slight extent also when boiled with water and calcium carbonate. Its ammoniacal solution gives off ammonia when boiled, and deposits unaltered curcumin. Baryta-water converts it into a blackish-red powder, but lime-water gives a red solution like that obtained with calcium carbonate. Curcumin is not affected by acid sodium sulphite.

Pure curcumin gives, as the mean of several analyses, 68·30 per cent. carbon and 5·63 hydrogen, leading to the formula $C_{14}H_{14}O_4$, which requires 68·29 C, 5·69 H, and 26·02 O; and this formula has been confirmed by the analysis of several derivatives.

The *dipotassium salt*, $C_{14}H_{12}K_2O_4$, prepared by adding a large excess of strong alcoholic potash to a hot alcoholic solution of curcumin, separates in flame-coloured crystals, and may be precipitated from weaker solutions by addition of ether. When first formed, it consists of globular radiate groups of flame-coloured needles, but assumes a deep claret colour on drying. It is freely soluble in water, somewhat less so in alcohol, and nearly insoluble in ether. The alcoholic solution assumes a magenta colour on exposure to the air, probably from oxidation. The *monopotassium salt*, $C_{14}H_{13}KO_4$, is formed on adding an excess of potassium carbonate to a hot solution of curcumin in absolute alcohol, and separates on addition of ether in crimson-black flocks, having the lustre of rosaniline and a somewhat blacker green colour. It is very soluble in water and in alcohol. It may also be made by adding an excess of curcumin to the dipotassium salt, or by adding potash, not in excess, to curcumin suspended in alcohol. The *calcium salt*, obtained by precipitation from the monopotassium salt, is flame-coloured, and slightly soluble in water. The *zinc salt* appears to be soluble, the *barium salt* insoluble; the *silver salt* appears to be very unstable.

The fact that only 1 atom of the hydrogen in curcumin can be replaced by the potassium in potassic carbonate, seems to indicate the existence of one, and only one, carboxyl-group in its molecule, whilst the replacement of a second H-atom by the action of an excess of potassium hydroxide points to the existence of a hydroxyl-group, probably a phenolic hydroxyl, and leads to the inference that curcumin is a diatomic monobasic acid.

Parabromobenzyl-curcumin, $C_{14}H_{13}(C_7H_6Br)O_3$, is formed by adding an excess of *p*-bromobenzyl bromide to an alcoholic solution of monopotassium-curcumin and separates in pale yellow crystals, which, after purification, melt at 76° to 78°. It is more soluble in glacial acetic acid than in alcohol, but crystallizes better from the latter; readily soluble in ether and in benzene, slightly in carbon sulphide, nearly insoluble in light petroleum; it is not attacked by potassium carbonate, but dissolves in caustic potash, though without the red colour characteristic of curcumin.

Oxidation of Curcumin.—By oxidation with chromic acid mixture, curcumin is wholly converted into acetic acid and carbonic anhydride, not a trace of terephthalic acid having been found in the product; by incomplete oxidation with potassium permanganate in alkaline solution, it yields vanillin,—

$$C_8H_8O_3 = C_6H_3(\overset{1}{CHO})(\overset{3}{OMe})(\overset{4}{OH}).$$

Hence, and from the fact previously established that curcumin contains a carboxyl-group, the authors infer that its constitutional formula is—

$$C_6H_3(\overset{1}{CH.C_5H_5.COOH})(\overset{3}{OMe})(\overset{4}{OH}).$$

The structure of the group C_5H_5 will be made the subject of further investigation.

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* From the *American Chemical Journal*, iv., pp. 77 to 91. Reprinted from the *Journal of the Chemical Society*, October, 1882.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 30, 1882.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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

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ANNUAL REPORT ON THE ROYAL GARDENS AT KEW.

THE Report on the Progress and Condition of the Royal Gardens at Kew, during the year 1881, which has just been issued, shows that whilst they are becoming increasingly important to all interested in botanical science, they fully maintain their popularity as a place of public resort. In fact, the number of visitors reached a higher point in the year 1881 than in any previous twelve months, amounting to 836,676, or 111,254 in excess of the year 1878, which had up to that time remained the maximum. The largest number of visitors admitted in any one day in the year was reached on Whit Monday, when it was over 50,000. But the work carried on in connection with these gardens, under the superintendence of Sir JOSEPH HOOKER and his able assistant, Mr. W. T. THISELTON DYER, is not confined to catering for holiday folks, but it also includes much that is of special importance to our readers, and as usual many of the passages in the report furnish matter suitable for quotation in this Journal.

Kew has now become the centre of botanical correspondence, and the authorities of the gardens actively participate in nearly all the experiments in acclimatization or the utilization of vegetable products that are made throughout the world. Hence these annual reports are always extremely rich in information as to the success or non-success of such attempts, many of which are made with a view to securing the better supply of drugs. In the present report, for instance, there is much interesting information respecting cinchona cultivation. We learn that a great deal of attention has been attracted, in India and Ceylon, to a cinchona which is supposed to be a hybrid between *C. officinalis* and *C. succirubra*, and to which reference has already been made in this Journal. Next to the *Ledgeriana* variety it is considered to be one of the most promising kinds. In Darjeeling it grows splendidly at an elevation where *C. succirubra* does not do well, and where *C. officinalis* will not grow at all, and it yields a bark which chemically resembles that of *C. officinalis*. In habit of growth this plant resembles *C. succirubra*, though at a distance it has more the appearance of *C. officinalis*; it never comes true to seed, the seedlings resembling as a rule nearly pure *C. officinalis*. The valuable cinchona associated with the name of Mr. LEDGER, which has recently been described as a distinct species by Dr. TRIMEN under the name *Cinchona Ledgeriana*, Moens, and a figure of which accompanies the report, is now being cultivated in India, Ceylon and Jamaica. As the bark yielded by this species is so rich in alkaloid it is satisfactory to read that, after a visit to the Dutch plantations in Java, Dr. KING is satisfied that the plants cultivated under this name at Darjeeling, seeds from which have also been sent to Jamaica, are true *Ledgerianas*. Satisfactory information has been received also respecting the Santa Fé plants, yielding "Columbian bark," which were sent to the Nilgiris in 1880. The present financial success of cinchona cultivation is illustrated by the fact that England now takes all the Jamaica bark that can be shipped and at remunerative prices, whilst it is thought probable another market for the bark will be found at no distant date in the United States. A paragraph is devoted to the Sikhim febrifuge, and, according to a quotation from a report by Dr. KING, the quantity used as a substitute for quinine in Government hospitals and dispensaries during the year ending May, 1881, was so great as to represent a saving of more than four and a half lacs of rupees, or a sum nearly equal to half the total expenditure on the Darjeeling plantations, including compound interest at 4 per cent., since their commencement.

Jalap is another drug the cultivation of which is said to have given rise to some inquiries, and to answer these an interesting account of the method adopted for the propagation of the tubers in the Ootacamund gardens is quoted from an official report. According to this, one acre of land should at the end of three years produce five thousand pounds of green tubers, which will yield when dried one thousand pounds of jalap powder. The cost of cultivation, collection and drying of the root during the same period is said not to exceed three hundred rupees, and it is therefore estimated that dried jalap tuber can be produced at Ootacamund at a cost of 4 annas and 10 pies (about 6*d.*) per pound.

A drug, known under the name of "waras," is exported in considerable quantity from Aden, and is said to be used as a substitute for kamala. Its origin being unknown, Captain HUNTER, Assistant-Resident at Aden, obtained specimens of the plant said to yield it in Arabia, and sent one to Kew, with a note stating that it had been gathered at an elevation of six thousand feet, on Jebel Dthubarah, sixty miles due north of Aden. The plant was immediately identified with *Flemingia congesta*, Roxb., a leguminous species, and of course, therefore, having no affinity with *Mallotus philippinensis*. Kamala yields to alcohol a splendid red colour, whilst the name "waras" signifies "saffron;" and

it is mentioned in support of the notion that a substance similar to kamala is yielded in Arabia by perhaps one or more species of *Flemingia* that dried specimens belonging to this genus stain paper in the herbarium a bright yellow colour when washed over with the alcoholic solution of corrosive sublimate used to protect them from the attacks of insects. *Flemingia rhodocarpa*, from the Mozambique district, has its pods covered with a bright red resinous pubescence.

The cultivation of various medicinal plants in the Government Botanical Gardens at Saharunpore, and the preparation from them of extracts for the use of the Indian medical department, has been the subject of some correspondence. Roots and seeds of English taraxacum have been sent to the gardens, and samples of extract have been prepared from plants raised.

The foregoing represents the principal subjects in this Report which are directly allied with medicine, but it does not by any means include all the matter of economic interest. The information respecting the plants yielding caoutchouc and gutta percha, for instance, is of great importance, considering the fact that we are believed to be within measurable distance of the exhaustion of the natural supplies of the latter of these substances at least. There is also good news for coffee drinkers in connection with results obtained with the "wild coffee" from *Cassia occidentalis*. But to these subjects we hope to have another opportunity of referring.

SIR JAMES PAGET ON UNEXPECTED THERAPEUTICAL EFFECTS.

When it was known that Sir James Paget had undertaken the task of initiating a new annual "lecture," instituted in memory of the late Mr. William Wood Bradshawe, and that he had chosen for the subject of his discourse "Some Rare and New Diseases," it needed no prophet to foretell the success of the experiment. The topics discussed were, however, so purely medical in their character that notwithstanding many portions of the argument were capable of apprehension and enjoyment by any well-educated person, we should not under ordinary circumstances give the address more than a passing notice in these columns. But one passage in it so well illustrates the tendency of a master to question where a novice would dogmatize that we feel warranted in referring to it somewhat more fully, because it has some bearing upon what we have always considered to be an injustice done to pharmacists. In the sensational ebullitions which are periodically manifested in our medical contemporaries in respect to the alleged adulteration of the medicines supplied by pharmacists one allegation which is ever present is that a proof of sophistication is to be found in the failure of medicines sometimes to produce the therapeutic effects expected. Of course, if it were the business of this Journal to bandy vulgar charges with such persons as the writers of these statements, the retort would be obvious; but nothing is gained by such personalities, and it is not in this spirit that we call attention to the words of the eminent lecturer on the subject.

We may premise that Sir James Paget throughout his discourse laid emphasis on the probability that different diseases are continually undergoing more or less modification due to heredity and other causes; some diseases in the form in which they were formerly known becoming exceptional, whilst others which a century ago were considered rare or had not yet been observed are becoming more and more frequent. This he attributes partly to the previous oversight of what existed, but he also considers there is sufficient evidence that new diseases are in progress of evolution and that some that are now looked upon as rare diseases are simply the earliest instances of new ones. He points out that the study of these variations of diseases is not one of mere pathological curiosities, but might be made of great practical utility, and he urges that one direction in which it should be pursued vigorously is in relation to the frequently alleged uncertainty of medicines and the disappointments in the use of supposed remedies that have caused substances long in good repute for the treatment of particular diseases to be spoken of with disrespect. Whilst in many cases it cannot be questioned that the belief in the utility of a medicine has been maintained by completely erroneous observations, yet in others uniform effects are not produced although the diseases treated seem to be the same. Referring to these disappointing results, which he illustrates as occurring sometimes during the use of bromide of potassium in epilepsy, of guaiacum in chronic rheumatic arthritis and of arsenic in lymphadenoma, Sir James says:—"I suppose there is not a "medicine in the Pharmacopœia which does not "sometimes disappoint him who gives it hopefully; "not one which is not therefore spoken of with "contempt or blame, as if it were a responsible "agent convicted of default. But here is an unfair "imputation. It is not these medicines which are "in fault, but ourselves. That which some call the "fallacy of therapeutics is generally the fallacy of "diagnosis. To state the facts roughly, we suppose "cases to be alike which are really different, and "very naturally the medicine which does good in "some of them is useless in others."

We do not wish to place any strained interpretation upon these words; in fact their meaning is too clear to allow of it being obscured or quibbled over. We do not even wish that they should receive an application for which they were possibly not intended. But we do suggest that in future they should be allowed to have due weight with any medical practitioner who is disappointed in the results following the administration of a particular medicine, before he jumps to the conclusion that the pharmacist who dispensed it was either dishonest or incapable.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association will be held on Thursday, January 4, 1883, at 8 p.m., when the following papers will be read:—"Genius, Talent and Industry in Relation to Pharmaceutical Research," by Mr. R. W. Giles. "Some Hints on Practical Photography," by Mr. R. J. MacDermott.

The Lord Chancellor has been pleased to add the name of Mr. Charles James Blelock, Chemist and Druggist, to the Commission of the Peace for the city and borough of Chester.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the above Association was held at the Royal Institution on Thursday, December 7, 1882.

In the absence of the President and Vice-President, the chair was occupied by Mr. T. Fell Abraham.

The minutes of the last meeting were read and confirmed, and the following donations announced:—The *Pharmaceutical Journal* and the *Canadian Pharmaceutical Journal.*

Mr. Edward Davies, F.L.S., F.I.C., delivered a lecture on "The Relation between the Physical Forces." The lecturer began with the consideration of chemical force, which was explained to be a form of cohesion, as illustrated by the experiments of Dr. Spring, who by means of enormous pressures brought about the chemical union of sulphur and copper, etc. The connection of heat and electricity with chemical action, as shown in a galvanic cell, was not a conversion of chemical force into heat and electricity, for the force which brought the elements together continues ever at work, keeping them together. They are produced during the impact of the atoms on one another, just as a bullet may by striking an iron target develope heat enough to melt it, but we cannot say that chemical action becomes heat or becomes electricity. The relation of electricity to magnetism was shown in the formation of an electromagnet, and by means of a Gramme machine the production of electric light by motion, and the reciprocal production of motion by electricity was strikingly illustrated. Thermo electricity, or electricity produced by heat, was then shown, as well as heat produced by electricity. The lecturer thought that it was too much to say that one kind of force could be transformed into another. Two forces might stand in the relation of cause and effect, but to go farther than this would naturally lead one to look for the transformation of matter of which we have no evidence. Some explanation of the telegraph, telephone and other applications of the physical forces brought the lecture to a close.

A vote of thanks, proposed by Mr. Birchall, and seconded by Mr. M. Conroy, F.C.S., was passed with acclamation, and Mr. Davies having briefly replied, the proceedings terminated.

YORK CHEMISTS' ASSOCIATION.

The first of a series of lectures was delivered before the members of this Association, at the rooms, 9, High Ousegate, on Wednesday evening, December 20, by Mr. Spencer, L.R.C.P., on "The Relationship between Medicine and Pharmacy," when there was a numerous gathering of the younger members of the trade.

The lecturer reviewed the ancient as well as the modern and scientific methods of the administration of drugs and chemicals, and gave practical information for the guidance of the rising students in pharmacy. After a brief reference to the antiquity of the use of drugs in the treatment of disease, Mr. Spencer observed that our present therapeutics were partially dependent on the results of clinical experience, and partly on a knowledge of the physiological action of drugs. Empiricism had been of great use to humanity, but was full of fallacies. The physiological action of drugs was studied partly by intentional experiments on both man and the lower animals, and partly by the results of poisoning. The advance of therapeutics meant the gradual inclusion of all remedies of which the physiological action was known. Having given several illustrations of this part of his argument, the lecturer dwelt upon the necessity of an advancing pharmacy; in the separation of active principles from drugs, and their preparation in shapes suitable for inhalation and injection under the skin as well as by the mouth. In the concluding part of his address he advocated the practice of pharmacy proper apart from a miscellaneous trade, and the abolition of dispensing by medical men and prescribing by druggists; the extension of provident and co-operative principles for the wants of the working class, showing that modern ideas of development and division of labour must be applied to medicine and pharmacy.

A vote of thanks was passed to the lecturer, and also to Mr. F. Slinger, who occupied the chair.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the session was held on Wednesday, December 20, in the rooms of the North British Branch, Mr. P. Boa, President, in the chair.

The minutes of the last meeting having been read and confirmed, the Chairman called upon Mr. J. Suttar to read a paper on the "Haloid Elements."

Mr. Suttar having referred to the history of the discovery of the elements chlorine, bromine, iodine and fluorine, and to the strong family likeness that pervaded the group, proceeded to describe their various compounds, and point out their characteristic and distinguishing properties. The paper was illustrated by a number of interesting and successful practical demonstrations by Mr. Macfarlane.

The Chairman moved, and Mr. MacEwan seconded, a vote of thanks to Mr. Suttar, which was heartily awarded, as was also a similar vote to Mr. Macfarlane.

Mr. J. D. Robertson then gave notice of a motion in connection with the sale of poisonous patent medicines, and the Chairman having intimated that an open meeting would be held on January 10, 1883, the meeting was closed.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on December 21, Dr. Gilbert, F.R.S., President, in the chair.

The following certificates were read for the first time: H. C. Bond, J. T. Donald, A. H. Jackson, H. Jones, J. E. Johnson.

The Secretary then read a paper—

On the Condensation Products of Œnanthol. Part II. By W. H. Perkin, jun.—When œnanthol is acted upon by nascent hydrogen it is well known that heptylic alcohol is produced, but, in addition, other products of higher boiling points are formed in some quantity, and the author has accordingly investigated them. The œnanthol was first dissolved in acetic acid and a sodium amalgam containing 2 per cent. of sodium added; when the action was finished, water was added and the oil which separated dried and distilled at 300 mm. pressure. The portion which distilled under 200° consisted chiefly of heptyl alcohol and œnanthol. The higher fraction contained the aldehyde $C_{14}H_{26}O$ and the alcohol $C_{14}H_{28}O$. The œnanthol was next dissolved in a large excess of ether, floated on water and treated with sodium. The aqueous solution contained some heptylic acid. The ethereal solution was distilled at 150°–200° when œnanthol and heptylic acid came over. The temperature then rose and between 250° and 310° most of the remainder came over. This distillate was refractioned and an aldehyde obtained in crystalline plates melting at 29·5, distilling between 266°–268°, and having the composition $C_{14}H_{28}O$; a second substance was also separated as an oil solidifying at −10°, boiling at about 320°, reducing ammoniacal silver nitrate and having the formula $C_{21}H_{40}O$. The author next studied the oxidation of the aldehyde $C_{14}H_{28}O$. The chief products (with chromic acid or silver oxide) were heptylic and hexylic acids, but with silver oxide an acid boiling 300°–310° was obtained in small quantity with

the composition $C_{14}H_{28}O_2$. By acting on the aldehyde $C_{14}H_{28}O$, dissolved in acetic acid, first with zinc slightly coated with copper and subsequently with sodium amalgam, an oil was obtained boiling at 270°–275°, which analysis proved to be the alcohol $C_{14}H_{30}O$ already obtained in Part I. The author then discusses the constitution of these bodies; the solid aldehyde and the acid obtained from it are isomeric with myristic aldehyde and myristic acid, but myristic aldehyde fuses at 53·8°, the new substance at 29·5°. From the oxidation products the author considers that the acid must be heptyl-pentyl-acetic acid—

$$\begin{array}{l} CH_3(CH_2)_5CH_2 \\ \quad\quad\quad\quad | \\ CH_3(CH_2)_4CH-COOH. \end{array}$$

The next part of the paper refers to the polymerization of œnanthol. The solid polymer $(C_7H_{14}O)_n$ which had been previously obtained was distilled and from various experiments the author concludes that $n=4$ and the body has the composition $C_{28}H_{56}O_4$.

Dr. Armstrong congratulated the author on having completed an arduous piece of work, which was besides very interesting as it gave a synthetical method for preparing the normal paraffins.

Professor W. Foster then read a paper—

On the Behaviour of the Nitrogen of Coal during Destructive Distillation, with some Observations on the Estimation of Nitrogen in Coal and Coke.—It is usually stated in text-books that coal contains about 2 per cent. of nitrogen, which when the coal is heated in close vessels, usually comes off as ammonia. The author, however, finds that only a small fraction of the total nitrogen comes off as ammonia. A Durham coal was employed which contained 1·73 per cent. of nitrogen and left 74·46 per cent. of coke. A weighed quantity of the coal was placed in a combustion tube, sealed at one end, and the issuing gas was washed free from ammonia by hydrochloric acid. The gas thus freed from ammonia was passed through a second heated combustion tube containing slaked lime; the additional ammonia thus obtained came from the decomposition of cyanogen in the gas. Taking the total nitrogen in the coal as 100, only 14·5 per cent. is evolved as ammonia, 1·56 per cent. as cyanogen, 35·26 per cent. is present in the coal-gas as nitrogen, whilst 48·68 per cent. remains behind in the coke.

Dr. Percy Frankland said that Dr. Hofmann, in his report in connection with the Exhibition of 1862, stated that only one-third of the nitrogen was evolved as ammonia, two-thirds remaining behind in the coke, and as far as he knew nothing had been done with the subject until Mr. Foster had taken it up. He had made some combustions of the coal used by that gentleman, using the apparatus employed in the combustion of a water residue. About ·024 gram of coal was taken; great difficulty was experienced in gettting all the nitrogen off.

Dr. Armstrong suggested that as regards the results obtained everything would depend on the temperature and it would be interesting to know how the quality of the coal affected the results.

Professor Foster said that in his experiments he had endeavoured to imitate as far as possible the usual process employed in the manufacture of coal gas. He hoped to be able to make some experiments shortly, in which he should employ a Siemens regenerating furnace, and so have the temperature under control.

The Secretary then read a paper—

On the Absorption of Weak Reagents by Cotton, Silk and Wool. By E. J. Mills and J. Takamine.—The object of the authors was the quantitative measurement of such absorption. 250 c.c. of the weak reagent (dilute sulphuric acid, dilute hydrochloric acid or dilute caustic soda) were placed in a bottle and kept at a constant temperature; in the bottle was placed also a known weight of the tissue (usually 3 grams). After a week or more the tissue was removed and a known volume of the emaining liquid titrated. The diminution of strength gives, so the authors state, the amount of absorption. In the second part of the paper the authors have determined in a similar way the ratio of absorption from mixtures of the acids. The paper contains numerous tables giving the results calculated to five places of decimals and the mean probable errors. The paper concludes as follows:—"There is thus a very intimate relation between silk and cotton, a relation which, whatever it may be in part, is shown by the changes to be, to a great extent, of a strictly chemical nature. We have, in conclusion, to express the hope that an investigation, while bearing on the one hand on questions of great technical importance, may not be without its value in the profounder future study of cotton, silk and wool; three bodies of definite chemical composition, but the intimate constitution of which still remains obscure."

Mr. Cross said the subject was extremely interesting as bearing on the constitution of fibre. He had made experiments of a similar kind, but had found it very difficult to separate the various factors involved. He did not think that it was correct to assume that the loss in strength of the solution was an accurate measure of the absorption by the fibre, because the fibre might absorb a solution of a different density to that left outside the fibre. He had investigated the subject and could not satisfy himself that the fibre did not take up a solution of different density to that left outside the fibre. In some experiments with aniline dyes he found that asbestos gave results similar to these obtained with some of the fibres used. The effect of the constituents of the ash seemed to have been neglected by the authors.

Dr. Schunck said it was important to determine the absorption by different samples of the same fibre.

Mr. W. A. Shenstone then read a paper entitled—

The Alkaloids of Nux Vomica. No. 2.—On Brucine.—The author has made many experiments as to the limited oxidation of brucine and strychnine, but at present without any definite results. Strecker, Liebig and others state that brucine when treated with dilute nitric acid yields, amongst other products, either methyl or ethyl nitrate or nitrite. As the formula of brucine suggested that it might be a dimethoxyl derivative of strychnine, the author proceeded to investigate the question. He finds that 1 gram brucine when heated with fifteen times its weight of hydrochloric acid for fourteen hours to 135°, then for thirteen hours to 145°, then seven hours to 150°, and finally seven hours to 160°, evolved 90·2 c.c. of a gas, which analysis proved to be methyl chloride; 1 gram of dimethoxystrychnine should give 113 c.c. During the analysis, after exploding with oxygen, much calomel was formed. It is probable, therefore, that brucine is strychnine in which two atoms of hydrogen are replaced by two methoxyl groups, and that it has the formula $C_{21}H_{20}(CH_3O)_2N_2O_2$. The contents of the sealed tubes after the escape of the gas were black and usually tarry; an examination led to no satisfactory results. The author also studied the action of hydriodic acid upon brucine, but the substances formed are unstable. The author intends to examine strychnine, and thus endeavour to make out the relations of the nux vomica alkaloids, since the removal of the methyl groups from brucine seems to give rise to bodies of such unstable character.

Dr. W. H. Perkin then read a preliminary note on—

Some Diazo-derivatives of Nitrobenzyl Cyanide.—When alcoholic solution of nitrobenzyl cyanide is mixed with an alcoholic solution of caustic potash, an intense crimson red colour is produced, which gradually changes through a brownish purple to a greenish blue colour. It appeared, therefore, that some definite though unstable compound was produced, and it seemed probable that it might yield a derivative with the diazo bodies. The alcoholic solutions of the above-mentioned bodies were mixed, and immediately afterwards an aqueous solution of diazobenzine chloride was added until the red colour dis-

appeared; the product was further diluted and filtered, the precipitate washed, purified by recrystallization, and finally orange-yellow needles obtained melting at 200°–202°, having the formula $C_{14}H_{10}N_4O_2$. The constitution of this body has not yet been established, but it appears to be analogous to the phenylanilo-acetic nitryl, obtained recently by Tiemann.

The Secretary then read a paper on—

Researches on the Induline Group. By O. N. Witt and E. J. P. Thomas.—The term induline is applied in commerce to a series of violet and blue dyes, distinguished by great fastness to light and atmospheric influences. Scientifically the term may be applied to all coloured compounds formed by the action of amidoazo compounds on the hydrochlorides of aromatic amines with elimination of ammonia. In the present paper the authors give an account of their researches on the formation of amidoazo-benzene and its action on aromatic hydrochlorides. It has long been known that amidoazobenzene, when treated with anilin hydrochloride or nitrate, produces a dark blue coloration. The authors find that invariably several colouring matters, differing from each other both in composition and properties, are formed, and that the nature as well as the quantities of the products depend largely on the temperature at which the reaction takes place, and the manner in which it is conducted. In this paper the authors describe these various compounds and their preparation, and promise, in a future communication, to explain the reaction and the constitution of the products.

The Society then adjourned till January 13, 1883.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held on Wednesday evening, December 20, an interesting paper "On Plant Names," was read by Mr. C. E. Stuart, B.Sc. The paper, which will be printed in a future number of this Journal, gave rise to a lively discussion, in which Messrs. Wrenn (President), Parkinson, Alcock, Dodd and others took part.

A hearty vote of thanks to the author was passed.

Subnitrate of Bismuth.*

BY F. HARRIS ALCOCK.

Some time ago, while engaged in examining a commercial sample of subnitrate of bismuth, I was led to collect a number of specimens and to investigate their general condition. The outcome was sufficiently important to induce me to review the history, general literature, modes of preparation, physical and chemical characters, impurities, and pharmacy of this remedial agent. I venture to think that an account of these several labours will be interesting.

HISTORY.

Basil Valentine, who lived 1413 (*circa*), says in his last testament "that bismuth is a bastard Jovis (Jupiter ♃ = tin)." Paracelsus (1493–1541) classed it amongst the semi-metals. It was for a long time known under the name of marcasite or pyrite, and had been confounded with tin and lead. But it is to Agricola, who lived about 1529, that we owe the first description and definite name of this element; he calls it bisemutum or plumbum cinereum, and says that it is a true metal which is usually added to tin in order to make it work better. This, however, does not seem to have been plain enough for those who were to come after, for we are told that Andrew Libavius (a German physician who lived 1550–1616) thought that the metal was the same as antimony, and Nicholas Lemery (1672) fancied that it was identical with tin. Boyle, the physicist (1626–1691), states, in one of his many dissertations, that the metal bismuth dissolves in aqua fortis (meaning thereby nitric acid), and that the resulting liquid, mixed with common water, was almost completely precipitated by its means. A. Libavius was cognizant of the fact that when a solution of the metal was made in nitric acid, and poured into water a precipitation occurred, but did not offer any remarks about its composition. Lemery describes the preparation (a translation of his original method, with remarks being given below), adding that the product weighs more than the metal used. He added common salt, and many chemists afterwards believed that it was essential to the process. This error was corrected by J. H. Pott (1692–1777), a German chemist, pupil of Stahl and Fr. Hoffmann, who made numerous experiments and increased the knowledge which was then possessed of this substance very much; they will be found in his 'Prima Collectio Observationum et Animadversionum Chymicarum' (1739).* Of the chemists who have contributed much to our information on this subject may be mentioned Geoffroy the younger (1753 *circa*), Stahl (1660–1734), Dufay (1698–1739), the Swede, Cronstedt (1722–1765), Kerwan (1750–1812), Bergman (1735–1784), G. Neumann (1683–1737), Hellot (1685–1766) and of those in this century, John Davy (1812); Jacquelin Berzelius, Phillips, Gmelin, Freundt, Lagerhjelm (1815), Stromeyer, Schneider, Nickles, Bechamp, Saint Pierre, Ritter, Ruge, Gladstone, Duflos, Muir, etc., and many others, and amongst them some eminent pharmacists of our own day.

MODES OF PREPARATION.

In honour of M. Lemery it may not be out of place to quote the method adopted by him. It will be found in his 'Cours de Chymie' (1675),† and as he was remarkable for a clear mode of expressing himself, and for his superior chemical skill, and also as he had gained considerable reputation for the manufacture of this article, you may rely on something useful as well as quaint. This is from a fair translation of his work by Dr. Walter Harris (1686):—

"Magistery of Bismuth is a tinn glass dissolved and precipitated in a very white powder. Dissolve in a Matrass, an ounce of Bismuth, grosly powdered with 3 ounces of Spirit of Niter,‡ pour the Dissolution into a clear Whiteware Vessel, and pour upon it 5 or 6 pints of Fountain water, in which you shall have dissolved beforehand an ounce of sea salt,§ you'l see a white powder precipitate at the bottom. Pour off the water by Inclination, and wash this Magistery several times, then dry it in the shade. It is an excellent Cosmetick, called Spanish White, that serves to whiten the complexion. It is either mixed in Pomatum (℥i to ℥i), or Lillie water (℥i to ℥iv)."

"*Remarks.*—You must use a large Bolt-head to dissolve the Bismuth in, because the great Ebullition that happens

* Read at a Meeting of the Association, November 8, 1882.

* Dr. J. H. Pott, 'Observationum et Animadversionum Chymicarum, præcipue circa Sal Commune, Acidum Salis Vinosum, et Wismuthum Versantium, Collectio Prima.' Berolini, 1739.

† This was a wonderful production by Lemery. Immediately after it was published it was received with general approbation and applause, and passed through numerous editions. Indeed, seldom had a work on a subject of science been so popular. Fontenelle said 'it sold like a satire.' New editions followed year by year, and it was translated into Latin and into various modern languages.

‡ "Spirits of niter" was prepared in Lemery's day by mixing together 2 pounds salt-peter and 6 pounds of Potter's earth, dried, placed into an earthen or glass retort, luted and heated in a reverberatory furnace until nothing more would pass over.

§ J. H. Pott, 1739, shows in his work, previously referred to, that the sea salt is unnecessary.

as soon as spirits of niter is cast upon it requires room to move in. You must likewise have a care, as much as you can, of receiving the Vapours at your nose or mouth, for they are very offensive to the breast. This quick and violent ebullition proceeds from the acid's immediate penetration of the large pores of the Bismuth, so soon as thrown upon it, and the acid violently divides all that opposes its motion. It happens also that the Bolt-head grows so hot that a man can't endure the hand on it because the points of the Menstruum do chafe against the solid body of Bismuth with such force that you may observe from thence much the same heat as when two solids are rub'd against one another, add to this, that the great store of igneous particles contained in Spirits of Niter, may much increase this heat. If the Dissolution becomes turbid through some impurities in the Bismuth, you must pour into it about twice as much water and filter it, for if you should go to filter it without water, it would coagulate like salt in the filter and not pass through. This Coagulation proceeds from the acid Spirits of Niter that are included in the particles of Bismuth, which finding too little liquid to swim in and disperse do gather together into Crystals when the Dissolution is cold. The impurity which commonly swims upon the Solution of Bismuth is a fat or bituminous matter, which will not dissolve in the Spirit of Niter.* This Magistery may be made by pouring into great quantity of Fountain water without any salt, and the Precipitation is the better because salt does encounter and break some of the acids that pure water alone was not able to weaken sufficiently. Now some difficulty appears in conceiving how plain water alone comes to precipitate Bismuth, Lead and Antimony, which the acid has dissolved, and yet can do nothing at all to the precipitating Gold, Silver or Mercury, without the assistance of some salt or other body. I do imagine that the former having larger Pores the acids cannot stick so close in them, but that water is able to force them out; but Gold, Silver and Mercury having finer pores in comparison than the other, do retain the acids so very closely, that the weak impulses of water alone can make no separation: some more active body is required to do it.

"The augmention which happens to Bismuth when made into a Magistery, does proceed from some part of the Spirit of Niter that remains still in it notwithstanding the precipitation and lotion."

The following are the principal official processes for the preparation of subnitrate of bismuth:—

B.P.—Purified bismuth in small pieces 2 ounces av., nitric acid (1·420) 4 fluid ounces, distilled water a sufficiency. The acid mixed with 3 ounces of distilled water and bismuth gradually added. When effervescence has ceased, heat to nearly ebullition is applied for ten minutes and the clear solution decanted very carefully from the insoluble portion which may be present. Evaporate the clear solution to 2 fluid ounces and pour it into ½ gallon of distilled water. Let the precipitate subside, decant the clear supernatant liquid, add ½ gallon distilled water to the precipitate, stir well and after two hours decant off liquid, collect and drain the precipitate in calico filter, press with the hands and drain it at a temperature not exceeding 150° F.

Heavy white powder in minute crystalline scales, blackened by sulphuretted hydrogen, insoluble in water, but soluble in nitric acid mixed with half its volume of distilled water, forming a clear solution which poured into much water gives a white precipitate. It forms with sulphuric acid diluted with an equal volume of water a solution which is blackened by sulphate of iron. The nitric acid solution gives no precipitate with diluted sulphuric acid nor with solution of nitrate of silver.

U.S.P. (1882).—This, which was published November 1, does not describe the process for the preparation of this substance, the reason being given in negative form in the Preface to the work, viz., that in the case of those chemical preparations where different processes yield different results, the process to be followed in each case is described in detail; it is therefore presumed that bismuth subnitrate, however prepared, should be uniform in composition.

U.S.P. (1872, *i.e.*, 5th Decennial Revision).—Bismuth in pieces, 2 troy ounces, nitric acid (1·42), carbonate sodium, each 10 ounces, water of ammonia (·960), 6 fluid ounces, distilled water q.s. Mix 4½ troy ounces of the nitric acid with four fluid ounces of distilled water in a capacious glass vessel, and having added the bismuth, set the whole aside for twenty-four hours. Dilute the resulting solution with 10 fluid ounces of distilled water, stir thoroughly and at the end of twenty-four hours filter through paper. Dissolve the carbonate of sodium in 12 fluid ounces of distilled water with the aid of heat and filter the solution through paper. To this, when cold slowly add the solution of nitrate of bismuth with constant stirring. Transfer the whole to a strainer, and after the precipitate has been drained wash it with distilled water until the washings pass tasteless and drain again as completely as possible. Then place the moist precipitate in a capacious vessel, gradually add the remainder of the nitric acid and afterwards 4 fluid ounces of distilled water and set the solution aside. After twenty-four hours filter through paper, and to the filtered liquid previously diluted with 4 pints of distilled water, slowly add the water of ammonia with constant stirring. Transfer the whole to a strainer and after the precipitate has been drained, wash it with 2 pints of distilled water and drain it again. Lastly, dry it upon bibulous paper with a gentle heat and rub it into powder.

French Codex.—Purified bismuth, 200 grams; nitric acid (1·42), 450 grams; distilled water, 150 grams; mix the acid and water in a flask, add the metal in coarse powder gradually to prevent excessive action. When effervescence has ceased, heat to ebullition to complete the solution; decant clear liquid after a little rest, and evaporate in a porcelain capsule to two-thirds and then pour into 40–50 times its weight of distilled water with constant agitation. Let precipitate settle, decant supernatant liquid and wash several times by decantation, collect on a filter, drain and dry.

German P. (1882).—Bismuth, 2 parts; nitrate of sodium, 1 part; distilled water, 5 parts; solution of caustic soda, 3 parts (15 per cent. and S.G. 1·159–1·163); warm nitric acid (1·185) 8 parts. The metal is treated in an iron crucible with the nitrate of sodium in very much the same way as our Pharmacopœia directs, and the resulting mass treated with the water and solution of sodium hydrate, mixed together, boiled for a short time, and the insoluble portion collected on a filter, and washed until free from alkali. The dried residue is then dissolved in the nitric acid gradually, and after the solution has been kept for a short time at a temperature between 80°-90° C. it is filtered through asbestos and the clear solution evaporated until reduced to 6 parts. One part of the crystals which will form on cooling is washed several times with water acidulated with a little nitric acid, and then rubbed down smoothly with 4 parts of water, transferred to a vessel containing 21 parts of boiling distilled water and stirred. The sediment is allowed to subside and the supernatant liquor while still warm is removed and the precipitate collected on a filter. Then, as soon as filtration has ceased, wash with an equal volume of cold water and dry at 30° C. (86° F.).

German (1872).—Pure nitric acid (1·185), 9 parts; coarsely powdered bismuth, 2 parts; towards end of action apply gentle heat. When nitrous fumes cease to be evolved, add a quantity of distilled water equal to half the amount of liquid, or until a white precipitate begins to form. Let the liquid remain until precipitate has subsided, and pour off clear liquid and evaporate

* That bismuth did neither contain fat nor bitumen was shown by Pott in his work previously cited.

until it begins to crystallize or until the weight of the solution is three times the weight of the metal used. One part of these crystals, washed with a little water acidulated with a little nitric acid, is mixed with 4 parts distilled water and the mixture poured into a vessel containing 21 parts of boiling water and thoroughly stirred. The precipitate thus formed, after the whole has cooled, is poured on to a filter, and washed with a very small quantity of water (*ne nimis*) and dried at a temperature not exceeding 30° C.

Of the above methods which are official, three are in the main identical, viz., B.P., Codex and German, being solution in nitric acid and precipitation by means of water, washing by decantation and drying at a low temperature. The dilution of the acid is essential to prevent too violent action, with consequent development of much heat, and loss by spirting and evaporation.

The B.P. method orders too much acid and therefore when solution of the metal is effected the resulting solution is evaporated with loss of acid. Perhaps it would be better to add the bismuth to the acid until a point is reached when it ceases to dissolve the metal and then a small and definite quantity of the acid could be added to bring the product to the proper strength for producing the B.P. article. The residue, which varies in quantity and colour according to the purity of the metal used, is, after the solution has been boiled, decanted or diluted until it would not act on paper, and filtered, or better, filtered through powdered glass, glass wool, or gun cotton. Evaporation should not be carried too far, for crystals form and cake and are then difficult to wash. When, after pouring into the *stated* quantity of water and washed as directed, it is placed on calico filter and drained, it would shorten the drying process if the precipitate were strongly pressed under a wooden press, as is done when phosphate of iron is made. The drying may be conducted at 120° F. in air closet, the result being a *white* powder not too dense and not acid to litmus paper when moistened with cold water. The supernatant liquors must in every case be preserved, for they contain varying amounts of bismuth which is held in solution by excess of HNO_3. Care is to be taken that distilled water only be used, for some waters contain solids which are very liable to be carried down when the nitric acid solution is poured into the water. To obtain uniformity in results the method adopted, whichever it may be, must always be carried out strictly in accordance with the recipe; even different amounts of water used in washing, difference in strength of acid used, and temperature at which the product is dried, tend to alter the nature of the preparation. It should not be allowed to remain in contact with the calico longer than is absolutely necessary, for this is said to darken the product from contact with the small particles on the surface of the calico when exposed to light. Drying may be done by placing in flat glass dishes as clock dials, etc.

The United States method of 1872 was quite different to the methods which had been used for a long time, in fact since the substance was known. The difference consisted in the use of carbonate of sodium and the liquid ammonia.

Before the 1864 edition of the U.S.P. the process was the usual one, but in their fourth decennial revision in that year the 1872 process was first authorized. It was devised with the intention of removing all the arsenic which might exist in the metal. The arsenic becoming arsenic acid, and by the dilution process arseniate of bismuth being sparingly soluble in the liquid so diluted is deposited in the time stated and was then removed by filtration. Addition of filtrate to the excess of carbonate solution caused precipitation of bismuth as subcarbonate, together with other metals except arsenic, nearly the whole of which remaining in solution as arseniate of sodium and was removed by filtration and washing the precipitate with water. The bismuth subcarbonate, or rather oxycarbonate, by solution in HNO_3 became again nitrate, and this solution was again set aside for twenty-four hours to permit any more arseniate of Bi which might have escaped previous treatment to be deposited. The filtered liquid was then mixed with water, which gave the subnitrate free from arsenic. As the liberated nitric acid retained some bismuth in solution, the water of ammonia was used to nearly neutralize the acid, which caused the precipitation of more bismuthous nitrate. This operation required great care, for the least excess of ammonia water would cause the precipitation of other metals which might be present, and to redissolve them again would be a difficult and unsafe way of rectifying the possible source of much impurity by the excess of precipitant. The advantage of the B.P. process over this is now easily seen, and would impress the practical man more if he carelessly made his preparation by the U.S.P. method. The supernatant liquors are never thrown away, for there are other compounds of bismuth used in pharmacy and the arts besides the one under consideration, and these can be made from them, when required, so that it is a mistaken notion to suppose than any bismuth will be lost by the British process; the supernatant liquors could be precipitated by carbonate of sodium, and the precipitate washed, dissolved in HNO_3 and reprecipitated by water. Many methods have been described to prepare this compound, so that it shall be more constant in composition, and contain less impurities. A few may be briefly mentioned here, excluding the many methods for purification of metal.

Lalieu (1878).—Treatment of well-washed and still moist oxide obtained from 200 grams of the metal (by means of AmHO, wash, add NaHO, put on water-bath for short time), with nitric acid equal to 48·5 grams of nitric anhydride, adding it in small quantities, and then heating the mixture until it becomes limpid and white; after the addition of a little water the subnitrate is thrown upon a filter, washed with twice its bulk of water, expressed and dried; the yield is 265 grams.

Huskisson's Method (*P.J.*, 1860).—This, something like the German process, is, it is said, adopted by manufacturers, viz., evaporation of nitric solution until it begins to crystallize, set aside and removing supernatant mother-liquor and wash crystals with a little acidulated water and using these only. This process can be repeated as often as necessary to ensure perfect absence of impurity. This would certainly remove much silver, copper, lead and arsenic, if present.

Brownen suggests, for removal of copper, precipitation from nitric solution by means of carbonate of ammonium (its best precipitant); wash with liquor ammonia and reduce to metal or dissolve at once in nitric acid and proceed as usual.

Umney, during a discussion at one of the Pharmaceutical Society's meetings some years ago, suggested the use of bismuth oxide prepared by precipitation by caustic alkali, and although he spoke of it as applicable to the preparation of the "Liquor" yet it may with considerable advantage be used for the other compounds, especially when copper, silver, etc., are absent.

Julius Löwe recommends the washing water to be made of 1 part of nitrate of ammonium with 500 of distilled water. Fresenius adopts this suggestion in his 'Quantitative Analysis.'

Schneider (as also Duflos) recommends solution of 2 kilogrammes of Bi in 10 kilogrammes HNO_3, *hot*, and after solution decant from sediment which contains the arsenic; on evaporation, the crystals, which separate, are free from arsenic. Bismuth arseniate is formed, which is insoluble in strong solution of nitrate of bismuth, although more soluble in water. A safe method consists in the examination of the metal, and if any impurities are present, to reject the sample, and, as Professor Redwood said some years ago could be done, viz., seek and pay for good and pure metal.

(*To be continued.*)

Review.

THERAPEUTICAL REMEMBRANCER, PRESENTING IN DETAIL ALL MEDICAMENTS ACCREDITED BY THE BRITISH PHARMACOPŒIA, with copious supplementary tables, etc. By J. MAYNE, M.D., L.R.C.S.E., L.S.A. Second Edition, revised. London: J. and A. Churchill.

It is difficult to decide what to say concerning this little book. It only deserves notice from the fact that of the many similar compilations we have the misfortune to see, this is the most badly arranged, the most erroneous, the most useless. One cannot understand how it could possibly have reached a second edition, unless the first consisted chiefly of presentation copies.

The various drugs are arranged according to their therapeutic action, and the whole concludes with a few notes on poisons and their antidotes. Some curious things which we suppose are meant to be prescriptions are, without a word of explanation, tacked on to some pages. We select a few specimens;—

On page 5—
H. Subchlor.
Tr. Cinchonæ.
Solve. (A teaspoonful dose.)

Again on page 6.
℞ Pil. H.
Ext. Colcynth. co.
Ipecacuanhæ pulv.
Saponis.
F. massa in pil. div.
Liqu. H. perchlor.

On page 18—
℞ Cambogiæ.
Potassæ carb.
Theriacæ. q.s.
M. pro. re. nata.
M. take.

And on page 22—
℞ Hellebori.
Ext. aloes barb.
Ferri et ammoniæ cit.
Colocinth.
Opii pulv.
M. f. pil.

We admire the author's ingenuity in working so many errors into the following three lines:—
Chalk (calcis chloridum)
Use. To prepare the following
Liq. Calcis chloratæ.

According to Dr. Mayne, white marble is synonymous with creta, and is a valuable antacid for intestinal disorders; æther purus and spiritus ætheris are the same substances. Sabadilla is derived from *Veratrum Sabadilla*; saccharated *carbonate* of lime is an antidote. Pix Burgundica is the tar exudings from spruce fir and *Pinus sylvestris*. Sinapis is the seeds of *S. nigra* only; galls are *nuts* or excrescences; syrupus ferri iodidi contains 4·3 grs. *oxide* of iron in fluid drachm; phosphorus is *never* given *in the solid form* (author's italics); pareira root is of course still derived from *Cissampelos Pareira*; and the following is a full description given by the author:—"Canna (the tous-le-mois, not well authenticated)." The following is the formula given for Fowler's solution:—"Arsen. acid, powder, powdered carb. potash aa—grs. 80, tr. lavand. co., drachms V., aqua distil, q.s." This is all, but the reader naturally would like to know what the quantum may be. In this revised second edition we find such gross errors in orthography as antimonium sulphuretum, sp. ætherus, colcynth, colocinth, lequ (we presume this is meant for liquor), syrupus ramni, rincing, zinzib, strobules. We find such expressions as acid solution of nitrate of H., solution of perchlor. H., and we are fairly puzzled by the following:—"Iodum (emmenagoges)," "sodæ (sodæ acetas)," "rosa centifolia (*i.e.*, aqua rosæ)," and "cardamomum (capsules of Malabar [elettaria] dried)."

It seems scarcely credible that such drugs as the following should be omitted from a therapeutic remembrancer, but we have failed to find them mentioned:—Ergot, chloral hydrate, bismuth salts, areca, nitrite of amyl, pepsin, hypophosphites, chloroform; and all the notice of cinchonas, on page 78, is "cinchonæ (var.)."

It is not our province to criticise this extraordinary production in its medical aspect, but we notice that galls are not mentioned as being used externally; that sp. æth. nit. is said to have the same action as æther, and, therefore, according to the author, to be useful in tetanus, epilepsy, hysteria, asthma and other spasmi; that dulcamara is good for gout, rheumatism, eruptions of long standing, jaundice and scrofula (on another page it is stated that it is "*perhaps* serviceable to form an infusion);" and that veratria is given as an *errhine* in gout. We should think an hour or two's continuous sneezing would be calculated to exert a very soothing influence upon a patient suffering from an acute attack. Tonics are described simply as "those medicines which have power of enhancing the quality of tonicity in muscular fibre," and buchu is described as being "scarcely ever selected even as infusion or vehicle."

In the so-called index, which is miserably insufficient, there is no drug mentioned, although throughout the book the reader is constantly referred for the properties of one drug to the description of another—thus: "Alcohol (v. Vinum Xericum)," "Calomel (v. hydrarg. subchlor)." We have devoted this amount of space to this wretched book to indicate to our readers its absolutely worthless character. To be frank, we are surprised that an M.D., L.R.C.S.E., L.S.A., should publish such a thing with such a title page, and we hope that when the *cacoethes scribendi* next seizes him, he will turn his attention to some subject other than medicine or pharmacy.

BOOK RECEIVED.

THE BREWER, DISTILLER AND WINE MANUFACTURER, giving full Directions for the Manufacture of Beers, Spirits, Wines, Liqueurs, etc. [Churchill's Technological Handbooks.] London: J. and A. Churchill. 1883. From the Publishers.

Correspondence.

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

"*Wilton*" (who is requested to comply in future with the regulations as to anonymous communications).—(1) Any person whose name is on the Register of Chemists and Druggists may legally carry on the business of a chemist and druggist, whether he is connected with the Pharmaceutical Society or not, (2) Consult the indexes of this Journal.

J. Finch.—Our views as to the rights of chemists to prescribe have been expressed in this Journal in numerous articles, to which we must refer you for the information you require.

J. Gould.—We do not feel at liberty to ask for assistance in imitating a particular proprietary preparation.

C. Ellison.—The following recipe for "Pick-me-up" tonic has been published before in this Journal:—Cardamoms, 5 parts; caraways, 2; cochineal, 2; cinnamon, 10; raisins, 80; orange-peel, 56; ginger, 14; gentian root, 3; wormwood, 2; quassia, 1; alcohol (·838), 750; water, 750. Macerate for fourteen days, filter, and add syrup, 200 parts.

Nemo.—We cannot.

J. Ward.—We are unable, after the lapse of time, to comply with your request. Please address future communications direct to the Editor, 17, Bloomsbury Square, in accordance with the notice on p. 533.

Ajax.—We have been unable to obtain the information.

Junior.—The formulæ has been asked for on several occasions without success.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Short, Dyer, Scruton, and Incognito.

SILVER MEDAL, PARIS, 1878.

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1.—**Morphia.** ($\frac{1}{40}$ of a grain.)
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13.—**Krameria.** Containing 2 grains of Extract in each.
14.—**Tannic Acid.** Containing $\frac{1}{2}$ grain in each.

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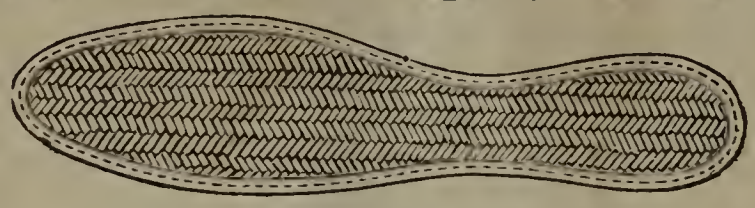

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Edwards & Son, 157, Queen Victoria Street, E.C.
Hovenden & Sons, 31 & 32, Berners Street, W.
Lynch & Co., 192, Aldersgate Street, E.C.
May, Roberts & Co., Cowcross Street, E.C.
Sanger & Sons, 150, Oxford Street, W.

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The only preparation which does not injure the leather.

Produces a perfectly black and permanent gloss, which will not rub off even when wetted, nor soil the most delicate article of dress.

It is invaluable for Ladies' and Children's Boots and Shoes, Waist Belts, Travelling Bags, &c. Each bottle is neatly packed in a cardboard box, and contains a sponge mounted and ready for use: thus JETTINE may be applied without soiling the hands.

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Evans, Lescher & Webb, 60, Bartholomew Close, E.C.
Hovenden & Sons, 31 & 32, Berners St., W.
Lynch & Co., 192, Aldersgate St., E.C.
Maw, Son & Thompson, Aldersgate St., E.C.
May, Roberts & Co., Cowcross St., E.C.
Sanger & Sons, 150, Oxford St., W., or of
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Of all Patent Medicine Houses, Druggists' Sundrymen, &c., or Proprietor, at

1/6 (1 lb.) Tins, per doz., 13/- ; 30/- (28 lb.) ; Barrels, each, 24/-
10d. (½ lb.) ,, ,, 7/- ; 16/- (14 lb) ; ,, ,, 13/-

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Guaranteed precisely as made in the laboratory, and under the superintendence of the late Richard Battley.

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JAMES v. JAMES.—Lord Romilly, the Master of the Rolls, on February 23, 1872, declared " that I had an equal right with other members of the Inventor's family possessing the receipt to make and sell this Blister."—R. J. JAMES.

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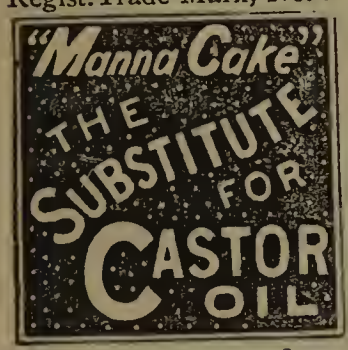

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3 and 4 oz., clear blue tinted, plain or graduated ...		...	7s. 6d.
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Price 1*s.* 6*d.*

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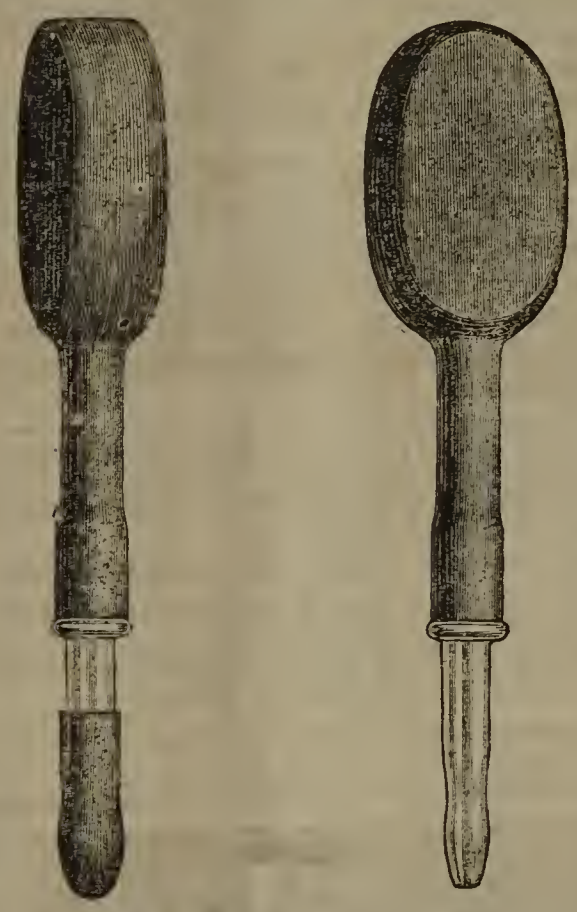

It is easily worked with one hand; the other hand being left free to close the mouth of the urethra around the nozzle.

It can be *completely* emptied (by pressing the sides together), and *completely* filled (by relaxing the pressure). Moreover, its fluid capacity is precisely that which is necessary to distend fully, but not unduly, the male urethra with fluid. Consequently, no air-bubbles can be injected by it into the urethra, and no fluid into the bladder.

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* "On a new kind of Urethral Syringe by BALMANNO SQUIRE, M.B. Lond., Senior Surgeon to the British Hospital for Diseases of the Skin."

Medical Times and Gazette, June 10th, 1882.

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LITHIA, with Potash or Ammonia.
CITRATE OF POTASH WATER.
POTASH AND SODA, B.P.
MINERAL ACID WATER.
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Sole Makers of Stevenson's Aërated Lime Water.
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The efficacy of these valuable medicines is due to the ABSOLUTE purity of the Balsam or Oil, and to the very GRADUAL solvability of the membrane as compared with gelatine. Box Copaiba (30 caps.) 18s. doz. Sandal (24 caps.) 36s. doz. Full Directions.

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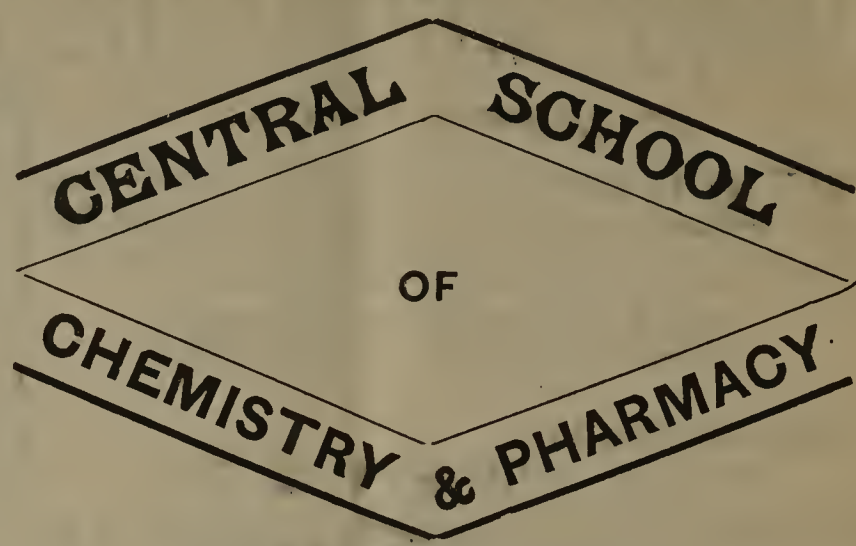

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173, MARYLEBONE ROAD, N.W.

At the recent Examinations held in December, **3** Major candidates presented themselves from this School, the following **2** passed:—

*Mr. J. J. MARSHALL. | *Mr. W. J. WILLIAMS.

14 presented themselves at the Minor Examination from this School, the following **11** passed:—

*Mr. C. BING.	Mr. J. T. LAMBERT.
* „ G. BRISLEY.	* „ F. C. LANGLEY.
* „ A. HOLWELL.	* „ C. L. PERKINS.
* „ W. R. HOPKINS.	* „ C. RIDGLEY.
„ W. J. JENKIN.	* „ H. E. SKYRME.

*Mr. G. RIGDEN.

* These gentlemen passed the first time of their presentation.

For Prospectus apply to Messrs. LUFF & WOODLAND.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

FOURTEENTH SESSION, 1882-3.

THE NEXT TERM WILL COMMENCE ON JANUARY 8, 1883.

For Syllabus, &c., apply to W. BAXTER, Secretary.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS
(*From the Royal School of Mines*),
130, CAMDEN ROAD, N.W.

TWO of my Students presented themselves at the December Minor; BOTH passed.

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MONDAY, JANUARY 1st, 1883.

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PRELIMINARY .	One Month... ...	£2 2s.
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MAJOR or MINOR (*From January 1st*).	February Exam.	£4 4s.
	April ,,	£8 8s.
	Until Qualified ...	£10 10s.
MAJOR AND MINOR .	Until Qualified ...	£15 15s.

By attending this College Students may be sure of receiving a thorough Pharmaceutical Education, as well as being efficiently prepared for their respective examinations.

The soundness and thoroughness of the education is demonstrated by the fact that half, *and sometimes more than half*, the total number of Candidates who pass at each examination are Students of this College.

N.B.—Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

At the Major Examination held this month, 3 Students were sent in from this College, 2 passed.

* Mr. A. Nichol. | * Mr. T. Richards.

* These Gentlemen passed both Minor and Major from this College at their first attempt.

MINOR EXAMINATION.

The following students were successful in passing the above examination, this month, from the Westminster College :—

Mr. P. Carr .....Sheffield.
,, A. B. Chater .....Elmdon.
,, H. S. Collins.....Bradford.
,, Webster Cox .....Liverpool.
,, H. Critchlow.....Oldham.
,, J. H. Freeman .....Ipswich.
,, R. W. Houfe .....York.
,, J. T. Lambert... .....Hoyland.
,, C. M. Luxmoore.....Bristol.
,, W. Jones .....Carmarthen.
,, C. H. M. Parker .....South Molton.
,, T. E. Pask .....Newark.
,, C. Puckey .....Herne Hill.
,, W. R. Rednall .....Northampton.
,, John A. Rees .....Cardiff.
,, A. W. Smalley .....Stamford.
,, W. T. Smith .....Bath.
,, F. M. Walton .....Reading.
,, Henry Whiffin .....Market Harboro'.
,, R. J. Young .....Bideford.

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IN THE
PHARMACEUTICAL JOURNAL.
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"CONCILIO ET LABORE."

MANCHESTER COLLEGE OF PHARMACY
225, OXFORD STREET, MANCHESTER.

Mr. W. S. TURNER, Pharmaceutical Chemist, M.P.S.

At the Minor Examination held in London from December 13th to December 20th, FIVE Students from this School were examined, ALL passed, viz.—

Mr. W. G. BLACKHAM Mr. W. F. GOODWIN
,, F. E. EASTWOOD ,, J. G. ISAAC
Mr. E. RYLEY.

"December 23rd, 1882.—I cannot thank you enough for the admirable training I have received, to which my success at the recent examination was very largely due."

The next Session will begin on January 8th, 1883. It will include both Day and Evening Classes and Laboratory instruction (no extra charge for chemicals or apparatus). Circulars giving full details are now being distributed ; gentlemen who have not yet received copies will greatly oblige by sending addresses.

PHARMACEUTICAL PRELIMINARY,

LONDON Matriculation, College of Preceptors, Apothecaries' Hall, Glasgow, Edinburgh, and all Medical Preliminaries. Rapid and thorough preparation, privately and in class. Also postal tuition for these examinations and Bell Scholarship. For particulars enclose stamp, Mr. Dawes, 1st B.A. (Lond.), 11, Burton Crescent, London, W.C.

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AS ASSISTANT, with time allowed for study. Within easy distance of London Bridge preferred. Disengaged. CHEMICUS, 98, St. George's Rd., S.E.

TEMPORARY.—An Associate, of good address and thoroughly steady habits, is open to an immediate engagement. C., 68, St. Stephen's Avenue, Shepherd's Bush, W.

EVENING or part day employment. Can give a day when required. Well up in all branches. Would take a permanency. ALPHA, 18, Graces Rd., Camberwell. S.E.

TO take charge or Manage a Branch. Age 26. Qualified. Good experience and references. Moderate salary for comfortable home. CHEMIST, 23, Horton St., Osmaston Rd., Derby.

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AS ASSISTANT, or to MANAGE Branch in a good Mixed business. Age 30. Married. 14 years' experience. Disengaged 15th inst. Particulars to ALPHA, 60, Bullock St., Bolton, Lancs.

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MIDDLE of January.—As JUNIOR. London or the South Coast. Good experience and references. Height 5ft. 6in. 5 years' experience. T., 9, Charles St., Brighton.

TEMPORARY. Ætat. 30. By day, week or month. Town or country. Thoroughly experienced in all branches. Irreproachable references. Terms very moderate. A. WOOD, 4, Woodfield Cres., W.

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AS ASSISTANT. In or out-doors. Age 21. L., 11, Tudor Grove, Colville St., Nottingham.

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ASSISTANTS WANTED.

AT once.—An ASSISTANT. Age 24 to 30. Time for study if required, but to one seeking a permanency. Apply, 9, Bruton St., New Bond St., W.

JUNIOR ASSISTANT. One acquainted with a General country trade. Address, with full particulars, to R. MARTIN, 97, High St., Maidenhead.

APPRENTICE.—A youth, about 16 or 17. One who has passed Preliminary examination preferred. Light Retail business. Two hours a day allowed for study, also time to attend lectures, and every assistance afforded towards passing examinations by end of apprenticeship. No Sunday duty. Premium required. References given. For full particulars apply to E. HOWARD, Chemist, 184, Old Kent Rd., London, S.E.

THE second week in January.—An ASSISTANT, about 23 years of age, in a light Retail and Dispensing business, on the South-east Coast. Apply, stating age, height, references, &c., to JOHN GREEN, Pharmaceutical Chemist, 196, High St., Deal.

ASSISTANT, competent, for a small Dispensing and Retail business. Apply to HENRY JONES, 139, Fulham Rd., S.W.

IMMEDIATELY.—A gentlemanly ASSISTANT as JUNIOR in the South of France. One with a slight knowledge of French preferred. Address in first instance J. HENRY JAGG, 127, Buckingham Palace Rd., London, S.W.

SENIOR ASSISTANT. Apply, if personally, about 10 a.m. PROBYN & Co., 55, Grosvenor St., Grosvenor Sq., W.

TO Chemists.—Qualified ASSISTANT. In a small business. A young man of good references and family. In a manufacturing district 10 miles from Charing Cross. Accustomed to ordinary Prescribing and Tooth Drawing. Write full particulars and salary to A. B., at Scripps's Advertising Office, 13, South Molton St., Oxford St., W.

IMMEDIATELY.—A Junior ASSISTANT. Apply, MEDICUS, Woolley & Co., Manchester.

AN American Company, about to introduce a patent medicine, desires to secure the services of a competent TRAVELLER. Must have a good acquaintance with the trade, and be thoroughly up in the business. Address with references, K., St. John's Station, Hurstpierpoint.

ASSISTANTS WANTED.

FOR the Cape of Good Hope.—An ASSISTANT, about 23 years of age. Must be well up in Dispensing. Apply to BARRON, HARVEYS & Co., 6, Giltspur St., City.

FOR the Continent.—A good ASSISTANT, speaking French. Address, X. Y. Z., care of Messrs. Davy, Yates & Routledge, Park St., Southwark.

A QUALIFIED ASSISTANT, for a Mixed business. Must be thoroughly competent and reliable. State full particulars, enclosing carte, to R. STOBBS, Pharmaceutical Chemist, &c., North Shields. Letters not answered within one week may be considered as respectfully declined.

AN ASSISTANT, in a light Retail and Dispensing business. Must have passed his Minor. One only kept. Hours from 8 to 8. Apply, stating age, salary, and reference, to T. HOLLIS, Druggist, Derby.

JUNIOR ASSISTANT (in-door). For Mixed country business. Only one assistant kept. Must be steady, industrious, and of good address. Apply (with photo. if possible), stating age, height, salary required, with usual particulars, to EDWIN WIDDOWSON, Chemist, Bulwell, Nottingham.

JUNIOR ASSISTANT. One accustomed to a first-class country business. Apply, stating age, salary required, and reference, to A. ROGERS, Newmarket.

MESSRS. PARSONS & DIXON, 1, Russell Gardens, Kensington, W., require a JUNIOR. Age about 20 or 21. Also a competent ASSISTANT. Age about 24 or 25. Minor qualification preferred. Enclose carte (to be returned), with full particulars.

IMMEDIATELY.—In a light Retail and Dispensing. An ASSISTANT. Not under 22 years of age. If with Minor qualification preferred. Apply, stating age, height, salary required, experience, and enclose carte (to be returned), to WALTER E. PAIN, 13, Sidney Street, Cambridge.

A YOUNG man as in-door ASSISTANT, in a quiet family. He must be well up in the general drug trade, and be of irreproachable character. Apply, Mr. S. HALL, 3, Alma Pl., Eastbourne.

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IMMEDIATELY.—For a fashionable watering place on the South Coast, an active, gentlemanly and competent ASSISTANT, holding the Minor qualification. Situation very comfortable and affording opportunities of improvement. Address, CLAVINIO, care of Messrs. Barron, Harveys & Co., Giltspur St., London.

IMMEDIATELY.—A thorough good JUNIOR. Must be steady, industrious, and an accurate Dispenser. One who desires a comfortable permanency preferred. Apply, stating salary required and references, with usual particulars, to ALBERT A. CURTIS, Dispensing and Manufacturing Chemist, Apothecaries' Hall, Gloucester. Also a vacancy for an intelligent youth, about 15, as an APPRENTICE. Moderate premium.

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ASSISTANTS WANTED.

MESSRS. PALK & SMITH, Strand, Torquay, require, early in January, a Dispensing ASSISTANT, who has had some experience in a good dispensing house. Please send carte, references, and usual particulars as above.

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IMMEDIATELY.— A Junior ASSISTANT (out-door). Apply, with full particulars, to H. PEARMAN, Commercial St., Newport, Mon.

IMMEDIATELY.—A Junior ASSISTANT. Must be well up in Dispensing, of good address, and produce satisfactory references. Apply, stating salary required, &c. (enclosing carte if convenient), to A. SMART, 22, The Common, Woolwich.

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SCOTLAND.—Very profitable light Retail, Dispensing and PRESCRIBING. In town of 10,000 inhabitants. Established 30 years. Vendor retiring. Returns vary from £20 to £30 per week. Price £1000; half of which can remain on approved security. Mr. BRETT, Valuer, Leicester.

GOOD old established BUSINESS. In thorough working order. Good profits. All full prices. Lease 10 years to run. Good house, warehouses and garden. Private entrance. JUDEX, care of Messrs. Barron Squire, Bush Lane, London.

TO Chemists and Druggists.—Immediately. In one lot or otherwise, the whole of the important stock of Drugs and Chemicals, Sundries, Patent Medicines, Fittings, Carboys, &c., and the Goodwill, on the Premises, 26, BUCKINGHAM PALACE RD. (late Ferris & Co.), comprising 5 26-inch specie jars on mahogany stands, 4 elegant carboys (9 galls.) on iron tramway stands, by Treble, medicine chests, 'dispensing department,' and other valuable effects of business. Stock sheet to be seen and effects viewed on and after Monday next, January 1st, on the premises as above.

MANCHESTER.—To be sold, freehold shop, house and premises, which carries with them the goodwill of one of the oldest Businesses in the centre of the town. Excellent opening for druggist who can practice Dentistry and Prescribe. Price £5000, of which £3500 may remain on mortgage. Early possession can be given. Application by principals or their solicitors only to WITHINGTON, PETTY & BOUTFLOWER, Solicitors, Spring Gardens, Manchester.

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MESSRS. GURDEN BERDOE have for transfer:—SOUTH COAST. Retail and Dispensing Trade. Same hands 16 years. Returns £600. Well fitted and stocked. £550. SURREY (12 miles out). Pleasantly situated. Handsome and well stocked shop. Good house and garden. Returning £750. For £600. These only require seeing. LONDON Suburb. Over 1000 houses being built opposite. Returns now £500. Well fitted and stocked. Only £400, or offer. Will do £15 weekly in time. MIDLANDS. Returns £1450. Elegantly fitted and well stocked. Only £1100. Another. Returning £1100. For £800. Several good opportunities from £80. Please apply, 30, Jewry St., Aldgate, City.

A VERY profitable BUSINESS. Situated in good thoroughfare, in good middle class locality. Shop in commanding position. Well stocked. Plate-glass fronts. 3 years' average £480. Full prices. Nearly all drugs. Strictest inquiry courted. None but bonâ fide purchasers need apply. Lowest cash price £400. Apply, by letter only, CHEMICUS, 25, Monastery Rd., Anfield, Liverpool.

FOR TERMS FOR ADVERTISEMENTS, SEE PAGE XV.

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Licensed Valuers & Chemists' Transfer Agents,

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KENT.—Dispensing and light RETAIL, in best position of good town. Established about a century. Present hands 15 years, and only for sale through succeeding to a large concern. Returns £800. Price £700.

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2. LONDON, N.—Good class Retail and DISPENSING. Very old established. Held by present owner 20 years. Returns £735. Price about £700.
3. Near REGENT'S PARK.—First-class Retail and DISPENSING. Returns nearly £700. Price about a year's returns.
4. SURREY, within easy distance of Waterloo.—Good class Retail and DISPENSING, with profitable appointments attached. Returns £1500. Price £700, or offer.
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Other businesses, town and country. Particulars free on application.

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CHEMISTS' Assistants coming to London for the examinations will find comfortable Apartments at 278, Kennington Cross. Terms moderate. Highly recommended by former students.

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Seven Gold Medals Awarded.

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[RICHARDSON'S].

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Coventry, March 7th, 1882.

"Your 'Compound Syrup of the Hypophosphites' is a highly perfected and reliable preparation, with which I am greatly pleased, for with no similar combination, by any reputed Pharmacist, have I obtained such certain and marked results. It is not possible to acquire a compound of greater purity and efficiency."

From HENRY DUNCALFE, Esq., M.R.C.S. of Eng., &c.

Sutton Coldfield, May 19*th,* 1882.

"I have great pleasure in stating that I have found your 'Syrup Hypophos. Co.' most invaluable in properly selected cases. I have prescribed several similar preparations, but I prefer yours, and am so satisfied with the results that I now use no other. In cases of nerve prostration, and anœmic conditions, as also in atonic indigestion, and some cases of bronchitis I have found it most useful."

From ALFRED L. PERKINS, Esq., L.R.C.P., &c.

Wellingboro', June 14*th,* 1882.

"Kindly send me another bottle of your 'Syrup Hypophos. Co.' I have tried it for some time and have found it act wonderfully in every case; it is marvellously efficient as a nerve tonic."

From ARTHUR E. POWNALL, Esq., L.K.Q.C.P., L.M. Ireland.

Chorlton-cum-Hardy, Nov. 13*th,* 1882.

"I have used your 'Compound Syrup of the Hypophosphites' for some considerable time in cases of anœmia, and nervous debility following exhausting diseases, and find it a most valuable preparation. It is a most elegant compound, and as efficacious as elegant."

From GEO. W. JOTHAM, Esq., M.D., M.C., &c., late Surgeon Kidderminster Infirmary.

Nov. 13*th,* 1882.

"I am very much pleased with your 'Syr. Hypophosph. Co.,' and consider it a most elegant preparation, and the most valuable and effective remedy in exhausting diseases which we possess."

From J. ATKIN, Esq., M.R.C.S.

Pendleton, Manchester, Nov. 16*th,* 1882.

"I have prescribed your 'Compound Syrup of the Hypophosphites,' and also used it in my household for some considerable time with very satisfactory results, finding it especially useful in anœmia, amenorrhœa, cases of brain weariness, the prolonged convalescences following typhoid fever, and as a substitute for cod liver oil in pulmonary phthisis and tertiary syphilis. I consider it a very useful and valuable preparation."

From S. WINTER FISHER, Esq., M.D.

Marine Parade, Brighton, Nov. 16*th,* 1882.

"It affords me much pleasure in bearing testimony to the great value of your 'Syr. Hypophos. Co.' I have used it both in practice and with members of my own family, and it has given me at all times the utmost satisfaction."

In ½ lb. bottles 3/-, and 1 lb. bottles 5/6 each.

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